University of Alberta

An Examination of Attitudes Toward Conservation and Private Stewardship Practices on Farms in Central Alberta

by

Mandy Scott Fisher

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Science

in

Conservation Biology

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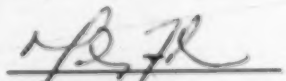

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ABSTRACT

Conserving habitat on private land is an essential component to sustaining Alberta's wildlife populations. The contribution that landowners can make should not be underestimated as 83% of the white area in Alberta is privately owned. Understanding the opinions and values of landowners as well as the innovation and diffusion of conservation practices will hopefully create greater support for habitat conservation by increasing environmental literacy and environmental advocacy.

A case study of private landowners' attitudes toward conservation and private stewardship initiatives in central Alberta revealed that over half of the respondents (57.7%) were involved in conservation projects. Most projects, however, were agriculturally oriented. Many landowners would only consider conserving habitat for wildlife if compensated. The majority of landowners (69.2%) did not think that the breaking and clearing of land was affecting wildlife populations. In addition, less than half of respondents (42.3%) were interested in learning about habitat improvement. An overall lack of concern and awareness seems to prevail as to the connection between wildlife and habitat. Consequently, conservation and government agencies may wish to: consolidate their efforts; target specific audiences for habitat agreements as well as soil and water conservation projects; support local opinion leaders as important sources of information and increase compensation rates. Ultimately, wildlife habitat preservation will require a change in ethics, as long term compensation will be difficult to maintain.

Key words: stewardship, wildlife habitat, conservation, innovation, diffusion.

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1 BACKGROUND AND NEEDS ASSESSMENT

Many wildlife populations have declined or have been irretrievably lost as a result of landscape fragmentation. The field of ecology has become very successful at predicting the outcome of fragmentation and habitat loss since the early works of MacArthur and Wilson. MacArthur and Wilson's equilibrium theory of island biogeography (1967) states that the number of species on an island represents a balance between extinction and immigration. The rate of immigration is determined by how isolated an island is; the more isolated the island, the lower the immigration rate. Extinction rates are a function of island size. Hence, populations on large islands tend to be larger and less vulnerable to extinction. Other factors contributing to population extinctions include island shape, isolation, number and amount of edge. Diamond (1975) applied the theory of island biogeography to conservation problems where he likened islands to nature reserves (Dearden and Rollins, 1993). Parallel thinking suggests that if parcels of land (i.e. islands of wildlife habitat) shrink with increasing development (e.g. agriculture, forestry, urban development), their ability to sustain wildlife populations will be reduced. Population extinctions are common in fragmented landscapes, especially for more specialized species of plants and animals that require specific types of habitat or large home ranges. Preserving larger, more contiguous areas of habitat allows for the conservation of entire communities as well as the preservation of ecological integrity.

The aspen parkland region of central Alberta has been subjected to fragmentation since the establishment of agriculture and urban development in the early 1900's. Increased farming efficiency, continued land clearing and wetland drainage have increased concerns about wildlife habitat. Since the majority of land in central Alberta is privately owned and used for agriculture, the need for private stewardship of wildlife habitat is becoming more apparent.

Many key actors must become involved in order to achieve larger, more contiguous areas of habitat outside protected areas. The cooperation of scientists, government and municipalities is critical in facilitating the protection of wildlife habitat. However, without the direct support of private landowners, the hope of preserving wildlife habitat in central Alberta will be slim. Promoting environmental stewardship will reduce the negative impacts of landscape fragmentation. In addition, reviewing environmental values, fostering cooperation, profiling successful stewardship agreements, and monitoring success will help ensure the conservation of the natural environment over the long-term.

1.1 What private land stewardship can accomplish

The contribution that landowners can make toward conserving land for wildlife should not be underestimated as 28% (83% of the white area) of Alberta is privately owned. Private land conservation becomes increasingly more important as agricultural practices continue to alter the landscape. Alterations include trends toward larger farms (i.e. removal of fence rows, backsloping and purchase of adjacent farmsteads), an increased scale of farm technology (i.e. larger, more efficient machines) , heavy grazing, and draining and filling of wetlands.

Private stewardship is meant to supplement existing protected areas on public land. Private reserves will be important in securing additional habitat in the parkland region of Alberta outside Elk Island National Park. Significant wildlife habitat, species, or wetlands of special interest may also fall on private land, making private land stewardship even more critical. If landowners are not economically penalized for protecting land they may even benefit through a sense of aesthetics, natural pest controls, or even economic gains through tourism opportunities (Lord, 1992).

Stewardship allows landowners to retain possession of their land, while establishing conservation projects on their own property. Stewardship invokes participation in conservation activities by those using the land, while respecting the social philosophy of the landowner's rights. Stewardship also educates the landowner on the benefits of soil and water conservation and wildlife, and creates an overall awareness of natural areas.

1.2 Factors affecting private land stewardship

One of the main constraints to private land stewardship is the paradox between private land and public wildlife. In other words, many landowners believe that wildlife habitat protection is a government responsibility. Complicating this issue is the cost of conserving habitat. In most cases, it is the landowner who must incur these expenses, or suffer a loss of income from keeping land out of production. With current economic policies and the loss of the CROW rate, a farmer or rancher can often gain more economically by placing marginal land in production than by leaving it for wildlife. Irrespective of whether land would otherwise be in crop production, current policy provides no rewards for using habitat for environmental protection. The Canadian Wheat Board system of quotas relies on an area basis rather than a productivity basis, thereby encouraging the maintenance of cultivated areas. Existing agricultural policy also makes land use change on cropland difficult because a farmer's income and income security will decline if they convert land into wildlife habitat. "It would appear that conversions from farmland to habitat are limited more by governments' willingness to allocate funds for habitat conversion programs than by farmers' willingness to participate in such schemes" (Girt, 1990). These disincentives lead to the use of marginal land, woodlots and wetlands, all of which are areas critical for wildlife.

An additional social disincentive to preserving wildlife habitat is trespassing (Kellert, 1981). Some landowners refuse to privately manage wildlife habitat because they feel that it interferes with their autonomy and fear problems associated with the public's use including hunting or wildlife viewing.

There is also a fear that small private reserves will be seen as a supplement to the larger public wildlife reserves already set aside. There is a potential problem that the provincial government may view private land conservancy as an excuse to reduce their commitment to establishing other wildlife reserves.

More specifically, the results of a survey of landowners in Alberta, (Haney, Phillips and Adamowicz, 1991), showed that respondents' age, proportion of land enrolled in a preservation program, land use beliefs, net household income, economic outlook, personal value of wildlife, belief in the effectiveness of compensation, risk acceptance, and belief in the economic value of wildlife all significantly affect either their decision to alter or preserve wildlife habitat and/or their choice of habitat preservation programs (Haney, 1991).

Individual conservation behavior is influenced by the attitudes of farmers and by context variables such as income and farm terrain. In addition, attitudes toward relevant agencies such as government departments and non-government organizations are very

important determinants of conservation behavior. Social behavior models such as innovation/diffusion theory have been successful at explaining agricultural innovation but have not fully explored the concept of conservation innovation. "More research is needed to evolve an integrated behavioral theory by drawing on the best from both economics and psychology" (Lynne et al, 1988). Stronger attitudes favoring conservation raise the levels of effort, suggesting that if attitudes are strengthened through increasing awareness, there may be less need for dependence on technical assistance and other net income-enhancing programs such as cost sharing and incentives. Economic incentives could increase effort, but responsiveness will differ with the strength of conservation attitudes. Ideally, a mutual re-enforcement should occur between financial incentives and a landowner's personal support of conservation.

Finally, ventures must be made by providing a sound legal base for landowners willing to maintain wildlife habitat. Legislation is useful for protecting private land habitats for two reasons. First, legislation can serve an important education/awareness role. A clear message is relayed to the landowner that elected representatives and existing policy consider wildlife habitat a serious concern. Second, legislation may be necessary in critical situations, such as endangered species protection. Although Alberta has some weak and indirect legal provisions for wildlife in place, more binding and specific wildlife habitat laws are necessary for privately owned land. In the case of long term agreements, such as conservation easements, efforts may be undone by a transfer of ownership, by funding cuts of a management program, or an individual landowner changing his/her mind to continue participation in a conservation program.

1.3 Overview of agencies involved in land stewardship

Habitat retention programs were initiated in North America as early as the 1940's. Ducks Unlimited has worked with different government and non-government agencies and private landowners throughout Alberta since 1937. Alberta introduced more formal private land stewardship programs in the 1970's. In 1977, a cooperative program between Alberta Agriculture and the Alberta Fish and Game Association was initiated. Several pilot projects were conducted starting in 1978 and were aimed at protecting wildlife habitat on private land. The Landowner Habitat Project was one of the first pilot projects and was initiated in 1986. It focused on three areas, The Counties of Minburn and Red Deer, and the Bow River and Eastern Irrigation Districts. It is important to note that programs designed to retain habitat on private land in Alberta have continued to be voluntary programs. Disregarding the recent passing of a conservation easement law, there has been no attempt to develop legislation or regulation that would require owners to retain wildlife habitat on their property (Rostron, 1995).

In 1985, the Alberta Fish and Game Association (AFGA) initiated two voluntary programs called the Habitat Steward and Heritage Farmstead Programs that were directed at recognizing individual landowner's efforts in conserving wildlife habitat on private land. Funding for these programs comes from the Buck for Wildlife Program. More recently, the AFGA established a non-game wildlife management program aimed at encouraging public participation and sponsorship. The AFGA also developed a public education program. Corporate sponsorship for this program is provided by Imperial Oil Limited. Operation Burrowing Owl is a recent initiative of this program in southern Alberta in cooperation with the AFGA and the World Wildlife Fund. The Red Deer River Naturalists initiated a similar program in the County of Red Deer. This program is also known as the Habitat Stewards Program. The Red Deer Naturalists modified the AFGA program to include all wildlife species, as opposed to just game species, and enlisted the support of Alberta Government Telephones (TELUS) as a corporate sponsor (Pearman, 1989).

ConservAction was a program initiated in 1989 and ended in 1990 as part of an Outdoor Master Plan in the County of Strathcona located east of Edmonton. ConservAction was jointly sponsored by the Buck for Wildlife Program, the Recreation, Parks and Wildlife Foundation and Alberta Career Development and Employment. The goal was to improve habitat for the direct and long-term benefit of wildlife in Strathcona County.

Another recent initiative is the Alberta Land Stewards' program. This program,

provides informal networking opportunities that are directed at conserving private land, sharing information, skills and success stories related to land stewardship.

Other Canadian initiatives include the Nature Conservancy which was established in 1963. The Nature Conservancy has been responsible for protecting millions of acres of habitat through a variety of stewardship agreements and has also established a nation wide conservation database. Other projects include the Conservation Reserve program supported by the Prairie Farm Rehabilitation Administration and the Economic Council of Canada. This program is similar to the Conservation Program in the United States. The PFRA program involves limited payment for acres removed from arable production but the land continues to be available for use as pasture or hay. This differs from the U.S. system in which no use of the retired land is allowed. This program may provide a compromise to strict habitat retention programs for some agriculturists in Alberta.

The North American Waterfowl Management Plan, is another Canadian venture aimed at enhancing and retaining waterfowl habitat. While many of their projects involve land acquisition, a number of conservation farming demonstration projects (e.g. Parkland Agricultural Demonstration Farm), are being used to encourage landowners to implement better soil and water conservation practices while benefiting wildlife.

1.4 Constraints of agencies involved in land stewardship

Three main concerns facing most conservation agencies in Alberta are program delivery, marketing and long-term funding. One difficulty is determining the level of funding required to achieve habitat protection goals on a province wide level. Complicating this task is the lack of data on the amount of suitable wildlife habitat that is currently threatened in Alberta's White Area (land not owned by the province). As habitat losses increase, it becomes unrealistic to achieve population goals set out by Alberta's wildlife status reports. In addition, providing direct monetary incentives as a means of encouraging landowners to retain or enhance wildlife habitat on a large scale can be a costly measure, especially for single agencies that generally operate on volunteer raised funds, membership fees or sponsor based budgets. Mechanisms for the public to contribute to habitat retention programs are relatively inefficient.

1.5 Types of land stewardship

There are several ways of achieving private land stewardship in Alberta:

1) Land acquisition by direct purchase through conservation agencies, government or private landowners.
2) Control by regulation or laws such as through the amended Environmental Protection and Enhancement Act or the Endangered Species Act.
3) Negotiated agreements (voluntary) between agencies and owners with or without monetary compensation.
4) Voluntary actions by landowners in the form of conservation easements, restricted covenants, or through special leases such as delayed haying, grazing system establishment or land use exchange programs.
5) Education of landowners to increase environmental advocacy through increased awareness.

1.6 Legal provisions for private land stewardship

Most of Alberta's valuable wildlife habitat on Crown land can be set aside and protected under current conservation legislation such as the Wilderness Areas, Ecological Reserves and Natural Areas Act 1, R.S.A., 1980, c. W-8 (Kwasniak, 1994). The Provincial Parks Act gives the Lieutenant Governor in Council authority to expropriate land for the purposes of establishing a provincial park. Under the Forest Reserves Act, the Minister of Environmental Protection can expropriate land for forest reserves. However, most of the lands in central Alberta are privately owned, and accordingly, current conservation legislation is inapplicable. With private land, there is a lack of mechanisms, including laws, which can be utilized to facilitate conservation. In Alberta, there are two legal options available for private land stewardship, conservation easements and restrictive covenants.

Conservation easements typically give the easement holder a right to use the land of another for a specific purpose. Easements run with the land and bind subsequent owners in perpetuity. Today, a conservation easement may be granted by the landowner for the protection, conservation and enhancement of the environment including biological diversity or the protection, conservation and enhancement of natural, scenic, or aesthetic values (Kwasniak, 1996). Where consistent with either of the above, an easement may protect recreational, open space or environmental educational use or use for research of natural ecosystems. A conservation easement may also be granted to any qualified organization as defined in the legislation, including the government, a government agency, a local authority , a corporate body, or a registered charity whose documents state that it may hold interests in land for one or more of the above mentioned purposes (Kwasniak, 1996).

One of the major difficulties with easements or restrictive covenants is the requirement for a dominant tenement. The common law requirements for an easement state that there must be a dominant tenement and a servient tenement. The dominant tenement is the parcel of land which must benefit from the easement. The servient tenement is the parcel of land which is subject to the easement. The easement itself must benefit the dominant tenement by making it a better or more convenient property. The dominant and servient tenements must be separate parcels of land not occupied or owned by the same person. Generally, easements must be positive in character. An easement permits the owner of the dominant tenement to enter onto the servient tenement to do something. One difficulty to the use of either easements or restrictive covenants is the requirement for a dominant tenement. Restrictions or easements placed on land which are not for the purpose of benefiting a dominant tenement are

considered to be personal contracts only and neither run with the land nor are enforceable against subsequent landowners. Consequently, in order for a landowner to use these tools, there must be another parcel of land, a dominant tenement, which benefits from the restrictions or easements placed on the servient tenement. Typically, landowners who want to donate land usually act on their own accord. There is simply no benefited separate parcel owned and occupied by someone else who plays the role of the dominant tenement owner. Another difficulty is the enforcement of conservation obligations. If the dominant tenement, or subsequent dominant tenements do not enforce the covenants or easements, no-one can compel them to do so (Kwasniak, 1994). Easements and/or restrictive covenants are not yet a common method of habitat protection in Alberta, but with the recent passing of easement legislation under the amended Environmental Protection and Enhancement Act (1996), it may become a more popular method for conservation.

It is important to note that with the granting of a conservation easement, certain amendments to the Income Tax Act have been made with the intention of increasing tax benefits in respect of donations of interests in land. Conservation easements constitute "ecological gifts" for the purposes of the Income Tax Act. Some concern has been expressed as to the efficacy of this amendment to convey the anticipated tax benefits for granting conservation easements (Kwasniak, 1996).

1.7 The importance and value of wildlife to Canadians

Major surveys were conducted by Statistics Canada in 1981 and 1987 to assess the importance of wildlife to Canadians (Filion et al, 1988). Approximately 100,000 questionnaires were mailed, with response rates of 87 and 55 percent, respectively. The trend over the two surveys shows that maintaining abundant wildlife is very important to over 80% of Canadians. In both surveys, Albertans expressed a stronger interest in maintaining all categories of wildlife than the Canadian average. Endangered species preservation was more important than general wildlife maintenance. As a result, Endangered Species Legislation is currently being tabled federally and in provinces across Canada where law does not already exist. Albertans showed a strong interest (86%) in non-consumptive activities regarding wildlife (e.g. photography, bird watching). Furthermore, 52.3% of Albertans had an interest in participating in wildlife related organizations such as naturalist and conservation groups and sportsman's clubs. Interestingly, all the surveys examined show that wildlife is important to the rural community, (Filion et al, 1988), and at a slightly higher level than the importance given by urban residents. It is important to note that non-consumptive activities such as wildlife viewing have recorded substantial increases in participation. Economically, direct spending related to wildlife activities in Canada was estimated at $5.1 billion in 1987, which does not include the commercial value of wildlife. Fifty two percent of moneys were spent on expenditures such as equipment and 21% on transportation relating to wildlife viewing etc.

Many conservation programs to date have been directed at the preservation of wildlife for the benefit of hunters. In North America, 78 species (11%) of the total breeding and migratory birds and 66 species (17%) of mammals are used for game purposes (Watson, 1990). However, in most natural communities, non-game species constitute the greatest portion of vertebrate species, individuals, and biomass, and are critical to energy flow and nutrient cycling in the functioning of ecosystems.

1.8 Placing an economic value on wildlife

Many attempts are being made at valuing wildlife. Non-market valuation techniques are an attempt to determine what value a market would give to wildlife, if a market existed. Contingency valuation is gaining popularity, and is the only direct method aimed at placing a monetary value on wildlife. It explicitly questions people on their willingness to pay for a good (i.e. wildlife) that does not have a market price. Contingent valuation is based on establishing a hypothetical market situation and asking individuals to reveal extramarket values contingent upon the existence of this market (Condon and White, 1994). This can be done by on-site interviews, telephone surveys or mail questionnaires. Preservation value can be measured using the contingent valuation method under 3 categories:

1) Option value- the value of maintaining wildlife so that it will be available for future use.
2) Existence value- the value of knowing that wildlife exists.
3) Bequest value- the value of providing wildlife for future generations.

There is also tremendous economic potential for wildlife activities on private lands either for consumptive uses (e.g. hunting) or non-consumptive uses (e.g. bird watching). However, property rights and liability concerns may inhibit some landowners from allowing the public on their property.

It is for the importance of wildlife to Canadians, and the non-market and market values of wildlife, that conservation through private land stewardship is beneficial. Private landowners can enhance opportunities in addition to those programs (Ducks Unlimited) already directed toward improving consumptive wildlife opportunities. Furthermore, with some changes to reduce conflicting policies in different government departments, landowners could reap the economic benefits of allowing the public to view, photograph, and paint wildlife on their property. Although not currently allowed in Alberta, a payment to the landowner could come in the form of royalties on an annual basis for the use of their property for wildlife based recreation. Payment could be calculated by the province based on a scale depending on the intensity of use. Moneys accrued by the landowner could increase efforts to preserve wildlife habitat and reduce dependence on conservation agencies for financial assistance or government compensation for land kept out of production.

1.9 Diffusion and innovation regarding land stewardship

The innovation and diffusion of ideas and new technologies throughout a community is as essential to habitat conservation as it is to agriculture. The diffusion of innovations refers to the process whereby new ways of doing things are spread within and between communities. The path that the information takes to reach a population is critical to the adoption of new ideas. Information about innovations may come via mass media, government, social networks, local newspapers and journals or simply one's next door neighbor (Figure 1, pg. 49). From an individual's point of view, the process of innovation starts with the initial awareness of the innovation followed by personal interest, then acceptance (or non-acceptance), which is usually followed by a trial and finally adoption. In between awareness and adoption is an interactive, iterative process of attitude formation, decision making, and action. The cumulative frequency of adopters over time describes an S-shaped (logistic curve). The frequency distribution over time is often bell-shaped and approximately normal. In regard to habitat conservation, landowners must first be aware of the need for conservation, followed by a personal interest in maintaining habitat on their own land, before a trial and adoption of preserving land for wildlife would occur. Their acceptance of conservation agriculture or habitat preservation will be influenced by their level of interest, attitudes toward wildlife and the benefits to be accrued by them. If attitudes are favorable, a trial of conservation may be necessary before the practice or preservation of land is finally adopted. Attitudes can be affected by government decisions, public pressure, fiscal needs and personal opinions and values, making private conservation decisions difficult.

"Individual innovation has been characterized in five ideal-type adopter categories (Rogers, 1962). The first 2 to 3 percent to adopt an innovation, the "innovators," are characterized as venturesome. The next 10 to 15 percent, the "early adopters," are characterized as responsible, solid, local opinion leaders. The next 30 to 35 percent are the "early majority," who are seen as being deliberate. They are followed by the "late majority," (30 to 35 percent), who are cautious and skeptical, and innovate under social and economic pressures. Finally, there are the "laggards," who comprise the bottom 15 percent. They are often characterized as "traditional," although they are often simply in a precarious economic position. Early adopters tend to have a higher social status and better education. In addition, they tend to have larger farms, more favorable attitudes toward modern business practices and more specialized operations. Early adopters are also argued to have greater empathy, rationality, and ability to deal with abstractions (Fliegel, 1993). They are less fatalistic and dogmatic, and have both positive attitudes toward change and science, and higher achievement motivation and

aspirations. Early adopters also report more social participation and network connections, particularly to change agents, and greater exposure to both mass media and interpersonal communication networks (Gartrell, 1992). Early adopters rely to a greater extent on personal reasoning, experience and observation to aid in their decision making. They also make greater use of reading materials and more formal advisory sources such as their local district agriculturist or wildlife agency. Generally speaking, operators of larger farms or individuals who own larger sections of land are earlier in adopting innovations either because of their increased ability to absorb risk or because they have better information and perceive less risk in change.

There are also characteristics of innovations that can affect the relative rate of adoption. The five most salient characteristics are 1) relative advantage, 2) compatibility with previous practices, 3) complexity, 4) divisibility and 5) communicability (Collette and Eastley, 1978; Fliegel and Kivlin, 1962; Rogers, 1962; Singh and Warlow, 1966) (Figure 1, pg. 49). The relative advantage of an innovation refers to perceptions of it being better than the idea or practice that it is designed to replace. This can mean greater profit, more efficient use of time or long term advantages such as sustaining wildlife populations. Compatibility describes the degree to which the new innovation is consistent with existing values, practices and equipment. Overall it would be easier to adopt innovations that do not require major changes in attitudes and values. Complexity relates to the degree to which an innovation is easy or difficult to understand and practice. Divisibility refers to the extent to which an innovation may be tried on a limited basis. Innovations that may be tried incrementally may be adopted more readily than innovations that are not divisible. Finally, communicability refers to the ease with which information or results about an innovation can be distributed to others. The easier innovations are to observe (e.g. through demonstration farms) the more likely they will be adopted (Singh and Warlow, 1966).

The classical model of innovation that characterizes the different stages in adoption and the individuals in a society could be applied to conservation as well as agriculture. The differences between the traditional application to farming practices and habitat conservation are two-fold. One difference is the intensive (cultivated) versus the non-intensive (non-cultivated) use of the land. The second difference is the utility to the landowner. With habitat conservation, there may be no economic utility to the landowner. This may be rectified by providing financial incentives or through education (e.g. Alberta Agriculture, agencies etc.), however, any hope for long-term preservation of wildlife habitat must be coupled by a change in environmental ethics.

1.10 Communication of innovations regarding land stewardship

Ripley and Rounds (1993), reported on how farmers and ranchers prefer to both access and process information of significance to rural life and primary production. They also traced the theory of diffusion and resulting innovation among rural people. The roles of change agents, opinion leaders and adopters were discussed in light of different methods transferring information.

The findings that pertain to the communication of agricultural innovations are also important for habitat conservation. The two most important components behind the successful diffusion of new ideas are those related to the spread of information about the innovation, and those related to reducing the resistance to adoption (Brown, 1968). From Ripley and Rounds' report we can learn that efforts need to be focused on smaller farms and ensure that information regarding land stewardship is successfully spread among the population. Many times, certain members of a community have considerable success at communication and subsequently encouraging innovations. For example, the district agriculturist (D.A.) can be an credible authority figure, and can promote the innovation and diffusion of new ideas while still maintaining respect among members of their community. Someone like the D.A. can act as an effective change agent and opinion leader in the agricultural community. When change agents share language, common attributes, values, beliefs, and status with landowners, communication is more effective and greater success is attained in persuading landowners to adopt new ideas (Collette and Eastley, 1978). An opinion leader's position is earned and maintained through technical competence, social accessibility and conformity to the system's norms (Collette and Eastley, 1978).

A survey undertaken by Alberta Agriculture found that the most common information sources are 1) neighbors and friends, 2) radio, 3) Alberta Agriculture, 4) farm magazines and newspapers, and 5) the district agriculturist (Alberta Agriculture, 1983). Unlike Ripley and Rounds' findings, universities and colleges, county field personnel, Agriculture Canada, and television received the lowest ratings. Respondents who have been farming for less than 30 years rate television as a more useful source than do respondents who have been farming for more than 30 years. The latter rates elevator agents and county field personnel higher than do younger farmers.

1.11 Chapter Summary

Private land stewardship is becoming increasingly important as agriculture and commercial development continue to alter the landscape. Private stewardship can preserve wildlife habitat in addition to nature reserves and parks. Private stewardship is less costly for the province than parks which require staffing and ongoing maintenance. However, several constraints can inhibit private land conservancy. One of the main constraints is the perception that wildlife habitat protection is strictly a government responsibility. Further issues are costs incurred by the landowner to preserve habitat, lack of incentives and the lack of government policy to encourage habitat preservation on private land. Landowners' behavior and receptiveness to habitat preservation is also influenced by individual attitudes, income, education, age, and farm terrain.

Non-government agencies have been an integral part in retaining wildlife habitat as early as the 1940's. Several programs have been available to Albertans including Buck for Wildlife, Ducks Unlimited, Prairie CARE and the Landowner Habitat Project. The three main constraints facing conservation agencies are effective program delivery, marketing and long-term funding. All conservation programs to date have been voluntary. All stewardship agreements are therefore subject to change depending on the needs of the landowner (some involve penalty), and change of ownership. Recently, however, a conservation easement law was passed in Alberta that enables the landowner to protect the land in perpetuity.

Wildlife is very important to Canadians. Major surveys done by Statistics Canada show that maintaining all categories of wildlife is very important to over 80% of Canadians. In addition, billions of dollars are spent on non-consumptive wildlife-related activities in Canada every year. Through private stewardship, a landowner can enhance opportunities offered by various programs, and reap some of the economic benefits of allowing the public to view and photograph wildlife on their own property. Moneys acquired by the landowner could increase the amount of wildlife habitat and reduce dependence on conservation agencies.

Innovation and diffusion theory can help understand and predict the process of adoption of conservation practices. In between the initial awareness of a new idea and adoption is an interactive, iterative process of attitude formation, decision making and action. Ultimately, a landowner's acceptance of conservation agriculture or preservation of habitat will be influenced by his/her level of interest, attitudes toward wildlife and the benefits to be gained by them. The five most important characteristics of innovations that affect the relative rate of adoption are; relative advantage, compatibility with previous practices, complexity, divisibility and communicability.

2 REVIEW OF PREVIOUS STUDIES REGARDING LAND STEWARDSHIP IN ALBERTA

One study conducted to evaluate land stewardship in Alberta was conducted by D.A. Westworth and Associates in regard to the Landowner Habitat Project (L.H.P.) (Brusnyk et al, 1990). The study was conducted in three areas of the province and included the Counties of Minburn, Red Deer, and the Eastern and Bow River Irrigation Districts. Of the 95 landowners who participated in the L.H.P., 88 respondents were interviewed using a detailed questionnaire designed to assess landowner's general wildlife knowledge and attitudes toward wildlife, wildlife habitat, farming operations, demographic characteristics and perceptions of the L.H.P. In addition to participant interviews, a random selection of 82 non-participating landowners was also made in the three study regions. A summary of the results indicated that the majority of landowners had spent the majority of their life on the farm. Participants with the L.H.P. tended to have more education and had a higher net income than non-participants. The majority of landowners had mixed farming operations ranging in size from 261 ha to 541 ha.

When asked about changes to their land, 13% of participants indicated that some changes had occurred over the last 10 years, whereas 23% of non-participants reported that they had cleared, drained or backsloped their lands. The majority of landowners interviewed valued the presence of wildlife on their land and were aware of the importance of various types of habitat to wildlife. When queried about the condition of wildlife habitat on their own land, 44% of participants rated it as excellent, 51% rated it as good, and 3% assessed the condition as poor. Non-participants rated the condition of wildlife habitat on their lands to be lower. Interestingly, both participants and non-participants rated the condition of wildlife habitat outside their lands as much lower than on their own property. This perception that the condition of wildlife habitat is much better on their lands than on lands owned by others is significant in that it may influence their tendency to manage their land in ways that are beneficial to wildlife or their willingness to become involved in habitat preservation programs. Almost two-thirds of landowners felt that the amount of wildlife habitat available on their land was stable.

Recent exposure to crop depredation by wildlife did not appear to be a significant factor in landowner's attitudes toward wildlife or their willingness to participate in the L.H.P. The majority of landowners indicated that they were satisfied with the L.H.P. In addition, financial incentives offered by the L.H.P. were considered to be adequate. Participants also found that incentives offered, and soil and water quality/conservation were significantly less important than non-participants. By comparison, wildlife related concerns or issues were significantly more important to

participants than to non-participants. Overall, the L.H.P. appeared to be a successful, cost-effective method of retaining wildlife habitat in Alberta. However, agricultural programs and other economic, political and social forces promoting more intense farming (e.g. continuous cropping, conventional tillage and more clearing, breaking and drainage) in existing areas and expansion into northern regions may offset any potential gains the L.H.P. may have for wildlife habitat in Alberta (Brusnyk et al, 1990).

A socio-economic assessment of the Buck for Wildlife project was initiated in 1991. Fifteen hundred angler, 1500 hunters and 3000 general households were surveyed to investigate the characteristics (demographics, attitudes, values, and needs) of anglers, hunters and general households relative to habitat conservation, their awareness levels of the Buck for Wildlife Program and its activities. The questionnaire was also designed to provide estimates of the values that anglers, hunters, and general households place on fish and wildlife habitat. Results showed that preservation motives, rather than recreation motives, are of primary interest to Albertans. Respondents were concerned primarily with air and water pollution, followed by fish and wildlife habitat loss, and forest development. Other key findings include the use of lottery funds to fund fish and wildlife habitat programs (Macnab and Brusnyk, 1993).

Another evaluation by Ewaschuk (E5 Ranching and Consulting) and D.A. Westworth and Associates was conducted in 1983 of the Red Deer County Habitat Retention on Private Land Program. Evaluation objectives were designed to achieve landowner interviews, conduct habitat evaluation, assess program costs, decide the effectiveness of the pilot program and make specific recommendations. Approximately one half of the 83 landowners involved in the program were interviewed to determine their attitudes concerning the program and their willingness to participate if a decision was made to continue the program. Of the 40 interviewees, 100% indicated that they were in favor of the program and would be willing to continue retaining habitat. However, only 23% of the program participants said that they had intended the land for other purposes before it was placed in the program. This largely reflected the capability of the land for agricultural production. Many participants felt that the program was successful at increasing awareness of the value of wildlife habitat. Thirty three percent reported changing their agricultural practices on lands not covered in the program in ways intended to benefit wildlife. 59% indicated that more hunters asked permission to hunt during the program. The proportion of landowners allowing hunting did not change.

An assessment of the effectiveness of the Red Deer habitat retention pilot program raised the following concerns: the inadequacy of the payments as an incentive for landowners to retain habitat on potentially arable land; the use of a random selection method in the sample which reduced the return on investment by including a large

number of habitat parcels on land that was not arable and therefore not threatened; the absence of a systematic habitat evaluation procedure which reduced the return on investment by including a substantial portion of lower quality habitat parcels; the high cost of fencing programs in relation to the benefits accrued to wildlife and, finally, the absence of incentives for landowners to allow the public to make use of the habitat areas in the program.

Eight specific recommendations were made from the pilot project. One encouraged the Alberta Fish and Wildlife Division to adopt a more pragmatic approach to habitat retention on private lands by focusing habitat retention efforts on areas with high quality habitat and a low marginal agricultural capability. Secondly, where critical wildlife habitat was being threatened, the use of land acquisition or permanent easements was recommended. Marginal agricultural lands could be retained through incentive programs. Other recommendations included a systematic evaluation of current habitat suitability, flexible habitat retention programs, fencing only when critical, and increasing public access to wildlife habitat. One other recommendation was that future programs include a "habitat recognition" option that involves nominal payments or other incentives for landowners with habitat that is not threatened.

Haney (1991) studied private land stewardship in Alberta. He studied wildlife habitat on private lands and analyzed land use trade-offs. Specifically, his purpose was to identify incentive compatible mechanisms by which society can cause private landowners to internalize the public value of wildlife. Survey results of 148 landowners showed that respondents chose more often to remove wildlife habitat that was situated on irrigated land than was situated on arable dryland. Survey respondents chose more often to voluntarily preserve a woodlot than a slough, without enrolling in any preservation program. Survey respondents' age, proportion of land enrolled in a conservation program, land use beliefs, net household income, economic outlook, personal value of wildlife, belief in the effectiveness of compensation, risk acceptance, and belief in the economic value of wildlife all significantly affect their decision to alter or preserve wildlife habitat or their choice of wildlife habitat preservation program. The two most acceptable land use options for arable dryland were lease for wildlife management and contract for joint agriculture-wildlife management. The two most acceptable land use options for irrigated cultivation were contract for joint agriculture-wildlife management and alteration of wildlife habitat for agricultural purposes. Interestingly, the two least acceptable options for private land were sale and donation for wildlife management. This combination of landowner attributes, current and potential land uses, and wildlife habitat preservation program attributes will determine the success of preservation efforts. Landowners must believe that they would be no worse off by

preserving their land for wildlife habitat. This belief may be affected by the availability of both financial and non-financial incentives to preserve wildlife habitat (Haney, 1991).

Lord (1992) reported on Operation Burrowing Owl, a stewardship program she initiated in 1990. Information and questionnaires were mailed to 21,000 landowners in the Burrowing Owl's range. 721 Burrowing Owl sites were identified through the completed questionnaires. Prior to the project, all landowners were aware of the Burrowing Owls on their land, though 63% had not been aware that the owls were threatened. Interesting findings came from questions regarding Burrowing Owl decline. Only 50% flagged a loss of habitat as a significant factor in their decline, 13% did not know or could not guess, while 33% guessed at reasons. One hundred percent of the participants said that they would have offered the same protection to the owls as they do now had there been no formal program. However, many landowners were unaware of the detrimental effects of pesticides on the Burrowing Owl. Only 8% percent said they were using different pesticides around the owls and 4% use pesticides in different areas. Two landowners who had never sprayed the burrows had told their neighbors not to spray their burrows due to the owls' presence. Sixty three percent of respondents believed that tax breaks or other concessions should be offered to encourage conservation of land critical to wildlife. Of those that responded negatively, three cited economic reasons (government could not afford it and/or we would pay for it in taxes), and one argued that people have to want to conserve habitat themselves in order for a program to work. The majority of landowners have made no change to their farm practice since the inception of the program. This is an interesting contradiction to the way in which the media have interpreted Operation Burrowing Owl, with the idea that many farmers are making large sacrifices to protect Burrowing Owls. It is interesting to note that two respondents who indicated that they have not changed their farm practices were ones receiving an annual contractual payment (Lord, 1990). The author felt that this brought to question the usefulness of paid agreements and thought that it might be advantageous to survey participants as to the usefulness of compensation and whether or not they have changed their farm practices.

Forty six percent of respondents entered the program because the owls were endangered. Twenty nine percent of landowners entered the program in part because it did not require changing farm practices. The remainder entered primarily because they had an interest in Burrowing Owls. Responses to program involvement highlighted the attention that single, familiar, rare, endangered or threatened species receive from the public. The author felt that stewardship programs that focused on conservation above the species level may require a different and more rigorous approach in order to be successful. Lord also found that landowners act as important sources of information.

Eighty three percent of respondents talk to neighbors and friends about the program. This relates to the critical process of the diffusion of new ideas throughout a community. Thirty seven percent of those who posted their yard plaques had comments from neighbors, showing that recognition among landowners does not go unnoticed and may help influence other landowners to engage in land stewardship. Interestingly, of those who were under non-paid agreements, 95% had no interest in cash payments (Lord, 1990).

Girt (1990) was commissioned to do a study by Wildlife Habitat Canada, Environment Canada, and Agriculture Canada on conserving wildlife on private land in the interests of achieving sustainable development. Many recommendations came from this study, including: increased rural planning, growth of farm advisory services, assistance for local volunteer programs, incentive programs for agricultural losses and wildlife habitat programs and that unwarranted subsidies that work against these projects be removed.

Haney, Ewaschuk, Phillips and Adamowicz (1991), published an annotated bibliography from a project report on private landowner wildlife habitat in Alberta: an economic analysis of retention and development. Conclusions from this study showed that a combination of landowner attributes, current and potential land use, and wildlife habitat preservation program attributes will determine the success of preservation efforts. The authors concluded that landowners must believe that they would be no worse off by preserving their land for wildlife habitat. This belief could be affected by the availability of financial and non-financial incentives.

A conservation easement stewardship guide was created in the United States by Lind (1991) for the Land Trust Alliance. Her guide outlined the need for stewardship, landowner considerations, proper documentation, easement enforcement and funding requirements. Locally, a report was compiled by Rostron (1995), outlining wildlife habitat retention programs for private land in Alberta. Six habitat retention programs were reviewed, including the Red Deer County Habitat Retention on Private Land Program, the Landowner Habitat Program, the Battle River Riparian Habitat Program, the County of Barrhead Partners in Conservation Program, the County of Strathcona ConservACTION Program and the Streambank Fencing Program.

Filyk (1992), of Wildlife Habitat Canada, published an article in the proceedings of the science and management of protected areas called "The role of private stewardship in habitat conservation and protection". vanPatter, Geerts and Hilts (1990) document a hierarchical model of seven stewardship enhancement techniques being encouraged in Ontario's Natural Heritage Stewardship Program. Messmer, Lively, MacDonald and Schroeder (1996) wrote an article that involved motivating landowners

to implement wildlife conservation practices using calendars. Here, 98% of respondents in a survey of landowners who had received a calendar had adopted one or more of 46 conservation practices illustrated on the calendar.

In addition to traditional publications, there is also a host of information on the Internet. When queried about private land stewardship, tens of thousands of items can be found for all of North America. Specifically, information regarding stewardship contacts, reports, guides, conferences and examples can be found ranging from soil and water conservation to wildlife and habitat conservation.

Esseks and Kraft (1986, 1988) found that the most commonly cited obstacles to participation in conservation reserve programs were the landowner's belief that their land was ineligible, their land was not in need of conservation, compensation from the USDA was too low, and the 10-year period was too long. Esseks' and Kraft's interviews with landowners also found that ineligibility and lack of knowledge about compensation and incentives were other reasons for lack of participation. In May of 1981, the proceedings of a conference on wildlife management on private lands was published. Here, the collective experience of resource managers, landowners, and concerned conservation agencies, nationwide, came together to produce a series of papers to refine and implement management schemes for habitat restoration and protection on private lands. Sessions focused on components of landowner and public perspectives, land management programs, and public relations and communications.

2.1 Research on innovation and conservation

Steed (1969) studied innovation and farmer characteristics. Independent variables were age, formal education, informal education, ownership, size of farm, organization participation and cosmopoliteness. The population used in this particular study was selected at random from dry land farmers in the Municipal District of Cardston, Alberta. The data was collected from a survey of 69 farmers. Analysis showed a relationship between all of the independent variables and rate of adoption for innovations such as soil testing, continuous cropping and wild oat control. Young farmers with a higher level of education and less farm experience showed a greater adoption rate. Respondents with larger farms also had higher rates of adoption although some variation occurred. Ownership and income variables did not show any effect. Empathy with conservation, cosmopoliteness, and organization participation were not found to be significantly related to the adoption of innovations.

Respondents indicated that knowledge of innovations came chiefly from personal contacts (Extension service, experimental farm, neighbor, agricultural meetings). Mass media sources (radio, TV, farm magazines, newspapers) were also used by many farmers to obtain information. Overall, farmer characteristics had little significance in affecting the adoption process. However, adoption patterns indicated that it was the characteristics of the innovation that were most important in determining the rate of adoption. The conclusions drawn from this study are important for agricultural innovation but can also be applied to conservation innovation by identifying the best methods of communication and identifying innovative farmers. Promoting conservation of wildlife habitat would be made easier by understanding those channels that effectively transfer information to farmers.

Nowak (1987) challenged the traditional argument that all conservation practices are unprofitable and that the diffusion process is largely irrelevant in explaining the adoption of conservation technologies. Nowak argued that the economic and diffusion process are complementary and are important in predicting the adoption of conservation practices. His findings suggested that diffusion factors increase in importance as the complexity of the innovation increases and decrease in importance as risk is reduced through institutional support. Financial incentives may be useful to help reduce the risk of using a new innovation that is relatively easy to implement. However, with more complex and permanent practices, Nowak stated that the most effective way of reducing risk to the landowner is through the generation and distribution of knowledge.

2.2 Chapter Summary

Several studies have been undertaken regarding private land stewardship in Alberta. They have found that the majority of landowners interviewed valued the presence of wildlife on their land and were aware of the importance of various types of habitat to wildlife. The majority of landowners felt that the quality of wildlife habitat was better on their own land than on other properties. This perception is significant in that it may influence their tendency to manage their land in ways that are beneficial to wildlife or their willingness to become involved in habitat preservation programs. Satisfaction from participants in conservation programs is generally high. Important to note is the fact that 100% of program participants would be willing to preserve habitat but only 23% said that they had intended the land for other purposes. In other words, the majority of participants are not sacrificing land or income for the sake of preserving wildlife habitat.

The major concerns regarding conservation programs are the inadequacy of payments; the random selection of landowners (which may include a large number of participants with land that is not arable and therefore not threatened); the absence of a systematic habitat evaluation procedure to select habitat of highest quality; the high cost of fencing programs in relation to the benefits accrued to wildlife; and finally the absence of incentives for landowners to allow the public to make use of the habitat areas in the program.

Individual conservation behavior has been shown to be dependent on age, education, proportion of land considered for the conservation program, land ethic, economic outlook, personal value of wildlife, belief in the effectiveness of compensation, risk acceptance, and belief in the economic value of wildlife. Some landowners act as opinion leaders in the community, and can often improve the level of conservation adoption, especially if some of the variables listed above are not optimal. Some landowners also act as important sources of conservation information. New ideas and practices are most commonly passed from neighbor to neighbor. This is important, as many landowners feel less threatened by a neighbor than a government official or agency representative, and might be more willing to protect habitat.

Land stewardship is currently coming under close scrutiny. As 28% of the land in Alberta is privately owned (83% of the White Area), and the possibility of preserving large tracts of undisturbed land not owned by the province or multi-national corporations is next to impossible, private stewardship is becoming increasingly more important. As a result, conferences, publications, and Internet access to stewardship "home pages", are becoming more common. A variety of communication avenues diffuses information to all levels of the population including landowners, government officials, and educational

institutions. The result of these efforts is making a strong statement as to the practical value of land stewardship to preserve wildlife habitat, conserve biodiversity, and to sustain land for production.

3 THE STUDY

3.1 Study objectives

The primary purpose of the case study was to examine landowner attitudes toward conservation and private stewardship initiatives in central Alberta. A second objective was to examine the transference of conservation ideas among landowners and their motivation/willingness to adopt new ideas. The case study was conducted in central Alberta due, in part, to accessibility and also because of the need for private land stewardship in the threatened aspen parkland ecoregion. Case studies involve an in-depth analysis of the background, current status, and/or interactions of a given unit and may employ a variety of methods to obtain data pertaining to the case. Research results should facilitate a better understanding of the issues facing the preservation of wildlife habitat on private land. Clarifying the issues involved in private stewardship will provide specific recommendations for policy change, encourage the formation of a sound legal base, and help direct wildlife groups.

3.2 Description of study area

The study area ranged over six counties in the Aspen Parkland ecoregion. Study respondents came from the counties of Lamont, Vermilion River, Minburn, Camrose, Strathcona and Beaver. Pre-test respondents came strictly from the County of Camrose.

These counties are located primarily in the aspen parkland ecoregion of central Alberta. Climatically and ecologically, the aspen parkland marks a transition zone between the boreal forest to the north and the mixed grasslands to the south. Aspen is the dominant tree species on moderate to well-drained sites while balsam poplar is typically found in poorly drained areas. Shrubs include saskatoon, dogwood, chokecherry, beaked hazelnut and snowberry. Wetter areas support higher densities of willow and black spruce. White spruce is the climax species in the aspen parkland but often forms only a minor component in older stands (Brusnyk, Westworth et. al., 1990).

Meteorologically, the aspen parkland has mean annual temperatures of 2.0 degrees Celsius, however, mean daily temperatures range from 13.0 degrees Celsius

during the summer (May to September) months to -12.5 degrees Celsius in the winter (December to February). Annual summer and winter precipitation values are 300 mm and 160 mm, respectively. Soil in this area is characteristically very fertile, which is demonstrated by the high density of farmland. The growing season (freeze free period) varies considerably (35 to 125 days) but averages around 95 days (Strong and Leggat, 1981).

3.3 Description of sample design

Private landowners were surveyed from several counties surrounding the Parkland Agricultural Research Initiative Conservation Demonstration Farm (P.A.R.I) located near Mundare, Alberta (Appendix 3). Survey respondents were selected from a membership list provided by the P.A.R.I farm that had representatives from all surrounding counties. The membership list was comprised of those individuals who have visited the farm and attend the seminars, demonstrations and meetings. In addition, two semi-formal focus groups were established with landowners (Appendix 5) and representatives from conservation agencies (Appendix 6). An additional interview was also conducted with the P.A.R.I farm. The survey was approved by the University of Alberta's Human Ethics Committee to ensure that none of the questions were objectionable or infringed on an individual's rights.

Quantitative and qualitative methods were used so that cross-correlational inferences could be identified. A questionnaire and cover letter (briefly describing the intent of study) were given to a pre-test group of 24 individuals in the County of Camrose. This County, not surveyed heavily in the main questionnaire, falls within the same geographical region as the County containing the P.A.R.I. farm. Using landowners in the County of Camrose for the pretest prevented the same landowners being surveyed more than once for the main survey. The questionnaire was modified slightly according to the comments provided by the pre-test group and then was administered to 67 landowners that had visited the P.A.R.I farm. All questionnaires were self-addressed and pre-stamped for the landowner's convenience and to help increase response rates. A reminder note was sent in an effort to increase the overall response rate. Respondents were requested initially in the cover letter to be the individual in the household contributing most to the total income.

Some questions from the mail-out questionnaires were qualitative and open-ended in an effort to understand landowners' opinions regarding the conservation and preservation of habitat. Other questions were quantitative in order to assess land use, conservation initiatives, environmental awareness, opinions of wildlife populations and

assess environmental advocacy. Simple knowledge tests designed to assess the level of understanding of the environment were included in the questionnaire as a measure of environmental literacy. Finally, some socio-demographic information (e.g. age, education, income) was collected in order for relationships within the data to be shown, especially for comparison to attitudinal variables, innovation/diffusion theories and the adoption of conservation practices.

Three sets of semi-formal focus group interviews were conducted. One group was representative of the landowners that have visited the P.A.R.I farm. This focus group allowed 8 landowners to articulate their views regarding conservation, and identify their views on the impediments to habitat preservation. Landowners ranged from subsistence farmers to large commercial farmers. The second focus group interviewed consisted of 6 representatives of conservation agencies involved in wildlife habitat preservation and improvement in Alberta. Representatives of the following were interviewed: the Alberta Fish and Game Association, The North American Waterfowl Management Plan (Prairie Care), the Landowner Habitat Project, Ducks Unlimited, Fish and Wildlife (Buck for Wildlife) and Operation Burrowing Owl. Finally, an interview with a representative of the Conservation Demonstration Farm was conducted.

Survey questionnaires focused on three main objectives:

1) Understanding landowners' attitudes and opinions toward wildlife and their understanding of private stewardship.
2) Measuring how landowners would contribute to the preservation of wildlife habitat.
3) To understand the transference of conservation ideas in the community and landowner's motivation to accept and implement new ideas.

Interview questions with landowners focused on three objectives:

1) To identify the types of projects landowners were doing or would be willing to do to contribute to habitat conservation.
2) To identify landowners' motivations for conservation and satisfaction/successes with current projects.
3) To identify whether or not landowners felt that they had influenced others in their community.

Interview questions with conservation agencies focused on four objectives:

1) To identify the primary purpose of the organization.
2) To identify the most and least successful aspects of the organization and what they would change if they could.
3) To identify what the organization had learned from past experiences.
4) To identify what kind of future the agency sees for wildlife habitat protection on private land.

Interview questions with the P.A.R.I farm focused on several objectives including:

1) Who does and does not come to the farm.
2) What attributes of the farm attract people.
3) How people found out about the P.A.R.I farm.
4) The most common questions people ask.
5) Whether people who visit the farm influence others in their community.
6) Concerns over wildlife and wildlife habitat.
7) Other conservation influences in the community.

3.4 Survey schedule

Pre-test questionnaires (N=24) were mailed in September of 1995. As very few revisions were necessary, surveys (N=67) were mailed to all landowners on the P.A.R.I membership list in the late fall. Reminder letters were approximately one month after the survey was mailed. Analysis of survey results began in March, 1996.

The interview with the P.A.R.I farm manager was conducted in the summer of 1995. Interviews with landowners and agencies were conducted between November, 1995 and March, 1996.

3.5 Data analysis

Data from the completed questionnaires were computerized and analyzed using procedures available with the SPSS 6.0 for MS Windows Program Package. Descriptive statistics including frequency distributions, cross-tabulations and Chi-Square analyses were generated for each cross-tabulation. These analyses were used to draw inferences about landowners' agricultural practices, attitudes toward conservation, general wildlife/habitat interest and knowledge, and socio-demographic information.

Missing responses were coded as 88. Statistics were tested at a probability level of $P<0.05$. All interview results were treated individually and they were not coded for computerized analysis.

3.6 Delimitations and limitations of study

Results from the study were limited by certain aspects of the sample design and data collection. Respondents were selected from a list of participants from a conservation demonstration farm. As a result, the sample is not completely random which brings in an inherent bias to the results. Quantitatively, the smaller the sample size the more limited the confidence ranges for describing some characteristic about a population. Furthermore, the respondents' participation in the P.A.R.I farm illustrates a previous interest in conservation which may not be representative of the general population. However, survey respondents were chosen specifically for a case study which was meant to help create a better understanding of the motivations behind private land stewardship and to identify characteristics of those who participate in stewardship projects. One further limitation was that interviews and questionnaires were conducted within one time frame and over several counties in Alberta. Public attitudes, commodity and land prices, and other social and economic forces will all affect the decision-making process of landowners. Consequently, the findings of this study will only remain valid for a period of time and will only represent landowners in central Alberta.

Many things can be learned from case studies. Case studies are particularly valuable when the evaluation aims to capture individual differences or similarities from one person's experience to another. A great deal can be learned about improving programs from studying failures and/or successes. A case can be a person, an event, a time period, a critical incident, or a community. Regardless of the level of analysis, a qualitative case study seeks to describe a unit (e.g. person, event) in depth, in detail, in context and holistically (Fowler, 1987). For example, the more conservation agencies aim at individual outcomes regarding land stewardship, the greater the appropriateness of qualitative case methods.

Mail-out questionnaires were chosen to allow for some quantitative analysis, although many other methods can be used (e.g. phone interviews, on-site surveys). Mail-out surveys are generally less expensive to administer than personal interviews or telephone surveys, can be accomplished with minimal staff and facilities, provide access to widely dispersed samples and allow respondents time to give thought to their answers or consult with others. The disadvantages of mail-out questionnaires are the ineffectiveness of mail as enlisting cooperation, not having the interviewer involved in

the data collection, and the need for correct mailing addresses.

With respect to the design of the questionnaire and focus group question, questions were partially drawn from previous literature regarding attitudes toward land stewardship and wildlife (Macnab and Brusnyk (1993) and Brusnyk and Westworth et. al. (1990), while others were from my own design. Questions were designed to be non-invasive, easy to understand and as non-biased as possible. Most questions were closed-ended, but allowed for comments. This is essential for coding responses and for comparison of responses across all respondents. With mail-out questionnaires there is always the problem of non-response. Efforts were made to reduce the number of non-respondents through the mail-out of a reminder card. Non-response is usually attributed to a refusal to be interviewed, people away on vacation, vacant housing units, or language or age difficulties.

4 SURVEY RESULTS

Fifty three (of 91) questionnaires (includes pre-test) were returned for an overall response rate of 58%. Reminder cards increased response rates by approximately 10%. There was no significant difference in the response rates between the pre-test survey and the main survey. Non-response was attributed to refusal, respondent moved from place of residence, or people were away from place of residence. Missing responses were attributed to the question being non-applicable or negligence in responding. All landowners and agencies that were asked to be interviewed consented.

4.1 Frequency distributions

Background information questions from the survey revealed that 69.2% of respondents owned their farms and 46.2% have lived on the land for more than 30 years. 36.5% of landowners own or lease land parcels greater than 1120 acres. Land was primarily used for agriculture (59.5%), although ranching accounted for almost one-quarter of responses (24.1%). The majority of landowners had not drained (73.1%), broken (69.2%), or cultivated land for crops (59.6%) in the past 5 years. In cases where land had been cleared, the three most common reasons were to maneuver machinery (30.3%), increase income (28.8%), and clean up weeds (21.2%) (Table 1).

Over half of respondents were involved in some sort of conservation project (57.7%). Many initiated the projects through personal initiative (47.9%). Other respondents found the P.A.R.I demonstration farm (31.3%) and local newsletters and radio (14.6%) to be useful in creating awareness. Only 2.1% reported that a friend caused them to initiate a project. Over half of the respondents received conservation publications (59.6%) but did not attend local conservation meetings (61.5%). Two thirds (67.3%) could name at least one agency with a conservation mandate. When asked what the three most threatening issues facing Alberta were, respondents rated air and watershed pollution as the most threatening (18.5%), and urban development (17.2%) and habitat loss (15.2%) were rated second and third (Table 2). The aspen parkland (34.6%) and boreal forest (28.8%) were thought to be the most threatened regions in Alberta.

Opinions of changes in wildlife in the past five years varied. Many respondents thought that the regional number of deer had decreased (80.8%), the number of carnivores had increased (67.3%), and half thought that the number of songbirds had not changed (51.9%) (Table 3). Opinions of wildlife numbers had slightly different results. Over half (59.6%) of the sample thought that there were just enough deer in Alberta.

Over half (53.8%) thought that there were too few upland birds, and 65.4% thought that there were just enough geese. Less than half (48.1%) thought that there were just enough beavers and 65.4% thought that there were too few songbirds (Table 4). A majority (69.2%) thought that the breaking and clearing of land in the past five years was not contributing to changes in wildlife populations. Almost all respondents thought that wildlife added enjoyment to living on their property (96.2%). Over half had suffered some loss as a result of wildlife (59.6%). Loss was usually attributed to crop damage by waterfowl (32.7%) and/or big game (19.2%).

Most respondents thought that preservation of habitat was important to extremely important (57.4%). Less than half (42.3%) thought that preservation of habitat was somewhat to moderately important. Almost three quarters (73.1%) of respondents thought that between 10-25% of the landscape should be left natural. Almost all respondents (94.2%) had some natural areas left on their own property. Landowners would be most willing to practise reduced tillage (14%), direct seeding (13.2) and use alternative herbicides/pesticides (11.2) to promote conservation (Table 5). Few were willing to consider conservation easements (3.5), enhance wildlife habitat (6.6) or replant native species (3.5) (Table 5). Less than half (42.3%) were interested in learning about habitat improvement and most would not be encouraged to conserve habitat even if they were recognized (69.2%).

All respondents were men. The majority (84.1%) were over the age of thirty and 82.3% have lived in Alberta all of their lives. The majority (78.9%) had some post-secondary education and almost one quarter (23.1%) had a university degree(s). Almost half of respondents (42.3%) made over $100, 000 dollars before taxes annually and 32.7% made more than $50,000.

Table 1: Reasons why the land was cleared, broken or drained.

Reason	Frequency of responses
Maneuver machinery	30.3
Increase income	28.8
Clean up weeds	21.2
Remove water	12.1
Livestock, road visibility	3.0
Lower water table	1.5
Control beavers	1.5
Other	1.5

Missing cases: 25 (people who did not clear, break or drain land)

Table 2: Opinion of the three most threatening issues facing Alberta today.

Issue	Frequency of responses
Air pollution	18.5
Watershed pollution	18.5
Urban development	17.2
Habitat loss	15.2
Logging	11.9
Agricultural development	6.6
Government spending	4.6
Species loss	3.3
Overhunting	1.3
None	0.7
Other	2.0

Table 3: Opinion of the change in wildlife numbers in the past 5 years.

Type of wildlife	% increased/% decreased/No change/No response			
Deer	5.8	80.8	13.5	n /a
Upland Birds	32.7	36.5	30.8	n/a
Waterfowl	40.4	40.4	19.2	n/a
Beavers	38.5	25.0	26.9	9.6
Carnivores	67.3	9.6	23.1	n/a
Songbirds	17.3	25.0	51.9	5.8

Table 4: Opinion of wildlife numbers.

Type of wildlife	Too little/Too much/Just enough/No response			
Deer	5.8	34.6	59.6	n/a
Upland Birds	53.8	46.2	n/a	n/a
Ducks	46.2	5.8	48.1	n/a
Geese	19.2	15.4	65.4	n/a
Beavers	17.3	28.8	48.1	5.8
Songbirds	65.4	32.7	1.9	n/a

Table 5: Conservation practices landowners would be willing to do.

Practice	Frequency of responses
Reduced tillage	14.0
Direct seeding	13.2
Alternative herbicides/pesticides	11.2
Rotational grazing	10.1
Woodlot preservation	10.1
Wetland preservation	9.7
Habitat enhancement for wildlife	6.6
Build nesting boxes	6.6
Build bird feeders	6.2
Delayed haying	4.7
Conservation easement/covenant	3.5
Replant native species	3.5
Other	0.8

4.2 Parkland Agricultural Research Initiative farm interview

When asked about what kind of people come to the P.A.R.I farm, a representative from the P.A.R.I farm thought hat mostly innovative, local, retired, older men with smaller farms were the most common as well as municipalities, public awareness groups, schools and tours. He thought that large, commercial farmers were the least likely to come because he thought that they had a rigid land-use system already established, and that new innovations would disrupt that system. He thought that the diversity of innovations available to farmers, ranging from agricultural to habitat conservation on a field scale was what attracted people to the farm. Most people found out about the farm through word of mouth, radio (CFCW), local papers and mail drop-offs put out by the demonstration farm. When asked if numbers of people had changed over the years, he thought that there had been an increase of approximately 50% due to annual meetings and summer tours.

The most common questions asked by visitors to the P.A.R.I farm concern soil management and crop production. Representatives of the P.A.R.I farm expect most questions from landowners to concern agronomics and improving or setting land aside for wildlife (i.e. land use exchange programs). When asked if he thought that members of the P.A.R.I farm influenced others in the community, he agreed and said that it generally happened through word of mouth, especially for those people with a "wait and

see" attitude. He has seen a paradigm shift in the last 5-6 years toward a better land conservation ethic. However, he thought that there was a fairly low concern about wildlife conservation specifically, although a new interpretive trail system put into the farm recently might help elevate awareness.

Other important groups he named that also promote conservation innovations are municipalities, agricultural fieldmen, agricultural service boards, Ducks Unlimited and the Lakeland Agricultural Research Association. Before the existence of the P.A.R.I farm, there was a more direct effort toward facilitating conservation innovations from Alberta Agriculture and municipalities, whereas now they act more as a delivery channel. Overall, he thought that even if people did not practice new innovations on their own farms, P.A.R.I has contributed to increased awareness and decreased skepticism regarding new conservation innovations.

4.3 Landowner Interviews

Summary of landowner's comments from 9 questions in order of frequency of response:

Question 1: Are you currently involved in conservation projects on your land, if so, what are they?

-direct seeding/zero tillage
-providing hay for deer
-leaving 5-10 acres natural-aesthetics, wildlife
-leaving riparian areas
-rotational grazing
-marking waterfowl nests
-not allowing hunting
-Ducks Unlimited projects (seeding, setting land aside, wetland preservation)
-planting native grasses
-leaving woodlots and fencing them
-winter wheat planting

Question 2: (If answer to Q#1 was No). Can you give me any reasons why you have not considered conservation projects for your land? (Probes: lack of awareness, financial considerations, personal reasons, no incentives.)

-need land for production for economic reasons
-if given money, would do more
-no incentives, subsidization, tax breaks offered
-no good habitat left
-no reason to

Question 3: (If answer to Q#1 was No). What factors would have to exist for you to undertake conservation projects?

-utility to own practices/land
-incentive programs
-require government (which designs many of the conservation projects for landowners) to also contribute financially
-tax structure reform
-practices must fit into farm function

Question 4: (If answer to Q#1 was No). What kind of projects would you consider?

-permanent cover program
-wetland preservation
-riparian area preservation

Question 5: What motivated/influenced you to consider conservation initiatives on your own land? (Probes: media, education, demonstration farms, neighbor, personal reasons).

-personal ethics
-demonstration farm
-media
-educational materials
-neighbors
-Ducks Unlimited
-agronomics
-courses offered at universities, colleges etc.
-CAESA funding

Question 6: At what time did you decide to consider/initiate conservation projects for your own land? Why then?

-1990; increased conservation ethics

-1993; soil erosion increasing

-all his life; father had always been a steward of the land

-1986; soil erosion increasing

-1990; maturity and increase in education

-1993; increased awareness

-1995; increased awareness

-1980; increased concern for the environment; increased awareness; agronomics

Question 7: Have you found the projects to be satisfying and/or successful?

-generally; they have helped decrease soil losses

-yes; winter wheat (D.U.) has been very successful

-yes; not hard to change if you know how and why you are doing it

-yes; increase appreciation for wildlife

-yes; increase numbers of wildlife

-yes; increase appreciation for wildlife

-yes; very satisfying overall

-yes; better results compared to conventional farming (i.e. full tillage, not delaying haying etc.).

Question 8: Do you think that you have influenced others in your decision to support conservation? How?

-yes; converted other family members, neighbors ask questions and watch over the fence

-yes; neighbors, friends

-yes; "coffee shop talk", peer pressure

-yes; neighbors

-yes; neighbors (zero till methods)

-yes; through work with Ducks Unlimited

-yes; neighbors (direct seeding, bison farming, through using new prototypes)

-yes; neighbors (zero tillage)

Question 9: Who do you think you have influenced most?

-father-in-law
-neighbors/friends
-municipalities
-own children
-himself

4.4 Conservation agency interviews: Alberta Fish and Game Association, North American Waterfowl Management Plan, Landowner Habitat Project, Ducks Unlimited, Buck for Wildlife (Fish and Wildlife), Operation Burrowing Owl.

Question 1: What is the primary purpose of the organization in question? (What sets it apart from other land conservation agencies?)

Alberta Fish and Game Association:
-not single species focused
-moneys collected goes to program not to staff members
-widely based
-funded by sportsman's dollars
-non-government but is partners with municipalities and government
-co-founder of Canadian Wildlife Federation

North American Waterfowl Management Plan (Alberta Prairie Care):
-the way it came about (in the 1970's and 1980's, there was a need to respond to decreases in waterfowl populations due to overhunting which led to a coalition of many different organizations)
-first priority is to buy land, next to initiate management agreements with landowners with options such as delayed haying, minimum tillage, rotational grazing or strict preservation

Landowner Habitat Project:

-"generational" protection (agreements span over successive generations)
-primarily government funded whose primary mandate is to protect and/or enhance habitat for wildlife (no focus on agricultural conservation)
-had opportunity to influence legislation
-funded in part by Buck for Wildlife (Fish and Wildlife) and Wildlife Habitat Canada (hunting dollars)
-set a market value for habitat
-re-imbursement fees were less than from other organizations so the program appealed mostly to the already converted landowners

Ducks Unlimited:

-programs are based on agricultural capability (prime agricultural land is left for crop production)
-larger budget than most agencies
-minimum 10 year lease

Operation Burrowing Owl:

-focuses on raising awareness of the Burrowing Owl
-offers 5 year Voluntary Habitat Protection Agreements

Question 2: What is the most successful aspect of the organization in question?

Alberta Fish and Game Association:

-100% of funds go to programs
-13,000 members in Alberta
-175,000 acres in various stewardship programs

North American Waterfowl Management Plan (Alberta Prairie Care):

-works into landowner's land objectives (e.g. rotational grazing)
-strictly voluntary on part of the landowner
-linkage to agriculture makes it appealing to a more diverse array of landowners
-opportune program initiation (due to drought in 1980's)

Landowner Habitat Project:
-concept of generational protection
-minimally intrusive
-Farming for Tomorrow publication (released fall 1996)
-Streambanks Fencing Program (through Buck for Wildlife portion)

Ducks Unlimited:
-one on one communication with the landowner
-employees work within the communities
-land-use exchange program (win-win situation for the landowner as land is exchanged between two landowners or Ducks Unlimited and another landowner depending on the quality of habitat versus crop/grazing production so that more appropriate and contiguous areas of habitat may be set aside for wildlife)
-credibility through long standing history

Operation Burrowing Owl:
-the sheer number of committed landowners (270) that have been a part of the project since 1989

Question 3: What is the least successful aspect of the organization in question?

Alberta Fish and Game Association:
-stewardship program ignores vegetation
-not enough promotions for the stewardship program (need for better marketing)
-low level of public awareness

North American Waterfowl Management Plan:
-perception that land is preserved so that hunters (and Americans) can shoot waterfowl
-public relations (competition of wildlife people with agriculture, land purchase takes land away from farmers
-perception of crop damage due to increasing numbers of waterfowl

Landowner Habitat Project:
-enforcement and monitoring not done
-people are uncertain about long term commitments that program offers

Ducks Unlimited:

-education/awareness needs improvement

-public opinion that Ducks Unlimited is a company designed to "grow" ducks for Americans

-need more support from non-hunters

Fish and Wildlife (Buck for Wildlife):

-eliminating the habitat branch of the project

Operation Burrowing Owl:

-the "coffee shop" rumors that undermine the true objectives of the program and perception that O.B.O is a government program when it is not

Question 4: If you, or the group of people working for the organization in question, could change the program, what would you do differently?

Alberta Fish and Game Association:

-encourage more people to take part in program

-hire more people to create an awareness of options

North American Waterfowl Management Plan (Alberta Prairie Care):

-solidify principles of partnerships with other agencies, government etc.

-expand the program beyond waterfowl needs

-include all stakeholders

-collect funds and support from naturalist groups as well as consumptive users such as hunters

-change policies that affect wildlife negatively (e.g. loss of CROW rate led to increase use of land for production and subsidies are invariably based on how much land is in production (Wylynko, 1996)).

Landowner Habitat Project:

-staff continuity, program continuity

-more manpower in field to reinforce conservation attitudes

-use the municipal level of government as a land use authority so that decisions are tailored to local conditions

-programs would be more effective if delivered by non-government organizations but backed and supported by government (legitimacy)

Ducks Unlimited:

-increase tax relief programs, easements

-timing is critical when approaching landowners regarding stewardship agreements

-require more government support

-wished they had started the environmental component earlier as opposed to the engineering component

Operation Burrowing Owl:

-multi-species approach (more holistic)

-encourage the strong connection that most rural landowners have with the land and increase their awareness of the impact some of their practices have on the environment

-increase urban people's understanding of rural lifestyles and natural systems

-need to manage people, not wildlife

Question 5: What have you learned from working with the organization in question?

Alberta Fish and Game Association:

- to treat every case separately

-that we still have an opportunity to save habitat and create habitat (partly through the help of organizations like the Alberta Sport, Recreation and Wildlife Foundation and volunteer efforts)

North American Waterfowl Management Plan (Alberta Prairie Care):

-that wildlife groups and agricultural groups are willing to sit at the same table to achieve a common goal

-partnerships do work and ultimately pay off

Landowner Habitat Project:

-can't pay landowners indefinitely so needs to be a shift in attitudes and values

-compensation is a great start to initiate commitment to a program or stewardship agreement

Fish and Wildlife:

-must listen to landowners to see what they want (public consultation is necessary)

-realize that some landowners want money while others just want recognition (offer alternatives-easements, rebates, agreements, compensation, recognition)

Operation Burrowing Owl:

-rural people have a strong connection to land and wildlife

-urbanites need better education regarding natural systems and rural lifestyles

Question 6: What kind of future do you see for wildlife habitat protection on private land?

Alberta Fish and Game Association:

-increased burden on private landowners

-increase in number of clubs and agencies involved in land stewardship (e.g. Parkland Stewardship Program initiated in June, 1996)

North American Waterfowl Management Plan (Alberta Prairie Care):

-a changing ethic among landowners

-due to a fluctuating market, more land (even land under agreements) will be converted for production (if a conservation ethic exists among landowners however, the desire to have wildlife habitat will be even more important)

-a diversification of land uses (game farming, ostrich farms and tourism)

-G.A.T.T (General Agreement on Trade and Tariffs) and N.A.F.T.A (North American Free Trade Agreement) have discouraged subsidization that may force more land into production

-subsidization is necessary for landowners as landowners will not benefit economically by having wildlife habitat as government owns the wildlife (technically speaking)

-that if fees could be collected for hunting or wildlife viewing on private land, proceeds could be taken to the County and subsequently used to reimburse landowners for land set aside for wildlife or to support tax breaks

Landowner Habitat Project:

-core change in tax structure

-a change in values and environmental consciousness

Ducks Unlimited:

-continue to increase awareness, lobby government for support

Fish and Wildlife (Buck for Wildlife):

-increased communication through technology (Internet), newsletters, organizations

Operation Burrowing Owl:

-continued resistance to new legislation (Endangered Species Legislation, Conservation Easements) or any other form of intrusive management that does not include the landowner in the decision making process

-increased government cutbacks making conservation decisions difficult

5 DISCUSSION OF SURVEY RESULTS AND INTERVIEWS

5.1 Significance of variable frequencies

Most of the landowners (36.5%) have large farms (more than 1121 acres). Larger farms have resulted primarily from a number of economic factors that have influenced farming practices in Alberta. Improved market conditions in the 1970's and the farm debt crisis in the late 1970's and early 1980's created incentives to bring more land into production (Brusnyk et al., 1990). Farms have become larger as more people move to urban centers, freeing up smaller parcels. Lack of government subsidies, and declining grain prices, undoubtedly contribute to more land being placed in production. Many landowners (46.2%) have been on the land for more than 30 years, which signifies little turnover in ownership. Land in this area is primarily used for crops (59.5%). This is what one would expect, as soil in this area is characteristically very fertile and suitable for agriculture. The majority of landowners have not drained (73.1%), broken (59.6%) or cleared (69.2%) land in the past 5 years. In cases where land had been cleared, the most common reasons were to maneuver machinery (30.3%) with greater ease, increase income (28.8%), and clean up weeds (21.2%) and bushes. A comparison with an evaluation of the Landowner Habitat Project revealed similar results. Increased income and improved land production/efficiency were the most commonly cited reasons for land change investments (75% of all respondents) (Brusnyk et al., 1990).

Over half of respondents were currently involved in conservation projects (57.7%). This could be attributed to the predisposition of the respondents to be interested in conservation in accordance with their attendance at the Prairie Conservation Demonstration Farm (P.A.R.I). Awareness of conservation projects came largely through personal initiative (watching other stewardship projects, reading newsletters etc.) (47.9%), and the P.A.R.I farm (31.3%), located near Mundare, Alberta. By comparison, participants in the Landowner Habitat Project were made aware of the project through word-of-mouth from friend and neighbor contacts (31%), and through contact with Habitat Retention Coordinators (26%) (Brusnyk et al., 1990). Newsletters, radio or friends were less common means of awareness in my study as well as in the Landowner Habitat Project.

Conservation projects most commonly involved direct seeding and reduced tillage. These projects often involve a personal decision to try new machinery, and are also methods being demonstrated by the P.A.R.I farm. More conservation farming practices were practised by participants as well as non-participants in the Landowner Habitat Project than in my study. This is surprising, as respondents to my study have all

visited the P.A.R.I farm and hence receive conservation farming information through newsletters. It is possible that my survey questions did not present all of the possible conservation farming options resulting in lower responses. Alternatively, results may be related to the lack of detailed information about wildlife-conservation farming relationships in Alberta. Presently, Ducks Unlimited is one of the few agencies that identifies agricultural conservation practices that are compatible with conserving waterfowl (wildlife) populations.

The majority (59.6%) of respondents did receive conservation publications, but do not attend conservation meetings (38.5%). This could be due to a lack of meetings in the community, or that newsletters are a much more passive form of receiving information and are often available free of charge.

Habitat loss was not rated by respondents to be one of the top three most threatening issues facing Alberta today. Air and watershed pollution (both at 18.5%), and urban development (17.2%), were rated as the most significant issues. Many respondents may feel that air and watershed pollution are threatening issues in light of the sewage treatment plants and refineries in the Edmonton/Fort Saskatchewan area. Urban development could be seen as a threatening issue as the city limits around Edmonton are rapidly expanding into new communities. These concerns could overshadow issues such as habitat and species loss due to the agricultural nature of the sample. Agriculturists close to Edmonton may be more concerned with urban development, air and water pollution and soil erosion, as these can all directly affect their livelihood.

The majority of landowners (67.3%) could name agencies with conservation mandates. Many of the names mentioned were not provincial agencies or NGO's that have a conservation mandate. Agencies mentioned were usually local or provincial agricultural groups that support soil and water conservation. This is likely due to the exposure to local and provincial groups that landowners receive through the P.A.R.I farm and other extension agencies.

Landowners rated the aspen parkland (34.6%) and the boreal forest (28.8%) as the most threatened regions in Alberta. It is true that the aspen parkland ecoregion is in imminent danger of extinction due to agriculture and urban development, and the boreal forest is threatened due to logging and mining activity. This result shows that landowners are aware of the danger that these ecozones face, however many landowners did not think that habitat loss, species loss, logging, or agricultural development were among the most threatening issues facing Alberta today. In other words, the factors that are causing these ecoregions to become threatened are not thought to be threatening issues. Perhaps landowner's concerns are focused on soil and

water conservation because of the financial losses that landowners can face as a result of crop damage due to drought, erosion and water pollution.

When asked their opinion of changes in the number of wildlife in the past 5 years, many landowners (80.8%) thought that there were fewer deer, more carnivores (67.3%) and no change in the number of songbirds (51.9%). Alberta Fish and Wildlife report (personal communication) that there are more white-tailed deer than ever before, and that songbird populations have declined dramatically over the years due to pressures in winter migration areas and habitat loss in the north. Perhaps there are localized changes that do not reflect Alberta Fish and Wildlife data, or landowner's perception of the change in wildlife is incorrect.

Many landowners' personal opinions were that there were just enough deer (59.6%), too few upland birds (53.8%), just enough geese (65.4%), too few songbirds (65.4%) and just enough beavers (48.1%) in Alberta. Many landowners stated that they felt there had been a decrease in the number of deer in the past 5 years but felt that currently there were just enough. Perhaps landowners have felt that traditionally there were too many deer, but with increased hunting pressure, harsh winters and habitat loss, the number of deer is now appropriate. Deer have also been known to eat grain and hay, which could contribute to the perception that there were too many deer. I found it disconcerting that 69.2% of landowners felt that the breaking and clearing of land in the past 5 years did not affect wildlife populations. One would expect with increasing numbers of agencies, and the message of conservation being sent to landowners through a variety of channels, that many would believe that habitat loss was affecting wildlife populations. I anticipated this particular group of landowners, who have shown some predisposition to conservation, believe that habitat and wildlife are directly related. These results are cause for concern that perhaps the message about habitat loss is being misunderstood. Landowners in central Alberta need to be aware that besides neotropical pressures on songbirds, agricultural activity in the north is also contributing to population decline. An overwhelming majority (96.2%) of landowners felt that wildlife added enjoyment to living on their property. This result is reassuring, showing that landowners are aware of wildlife on their property and can also appreciate its existence.

Over half of landowners have suffered some financial loss as a result of wildlife (59.6%). The most common form of loss was crop damage from waterfowl. Perhaps the result that the majority of landowners would not be willing to conserve land for wildlife comes from a fear that increased numbers of wildlife may cause crop damage or stock predation. One third of respondents (32.7%) felt that the preservation of wildlife and natural areas was moderately important, while (57.7%) felt that it was important to extremely important. The opinion that the preservation of wildlife and natural areas is

important may come from personal beliefs and exposure to conservation messages. Almost three-quarters (73.1%) of respondents felt that between 10-25% of the landscape should be left natural. It is interesting that many landowners felt that the breaking and clearing of land was not affecting wildlife, but did feel that preserving wildlife and 10-25% of the natural landscape was important. There seems to be some contradiction in landowners' opinions, or an overall lack of awareness as to the connection between habitat preservation and sustaining wildlife populations.

An overwhelming majority (94.2%) stated that they had some natural areas left on their property. This result should be reassuring to conservation agencies, as these landowners may have potential wildlife habitat for stewardship agreements.

The five most common practices landowners listed that they would be willing to do to contribute to conservation were, reduced tillage (14.0%), direct seeding (13.2%), alternative herbicides/pesticides (11.2%), rotational grazing (10.1%) and woodlot preservation (10.1%). These practices relate directly to soil and water conservation as opposed to wildlife conservation. This focus reflects the nature of the sample, whose main concern is to improve crop yield, while still conserving soil and water. Conservation groups may wish to consider these results in terms of their target populations. It would seem that agriculturists' main focus is one of conserving land for future production, and that wildlife conservation comes secondary. Perhaps the main focus for wildlife habitat agreements should be with acreage owners or landowners with large grazing leases. This way, commitment to wildlife will be the primary concern and would not likely be compromised by fluctuations in income or grain prices that could force land into production.

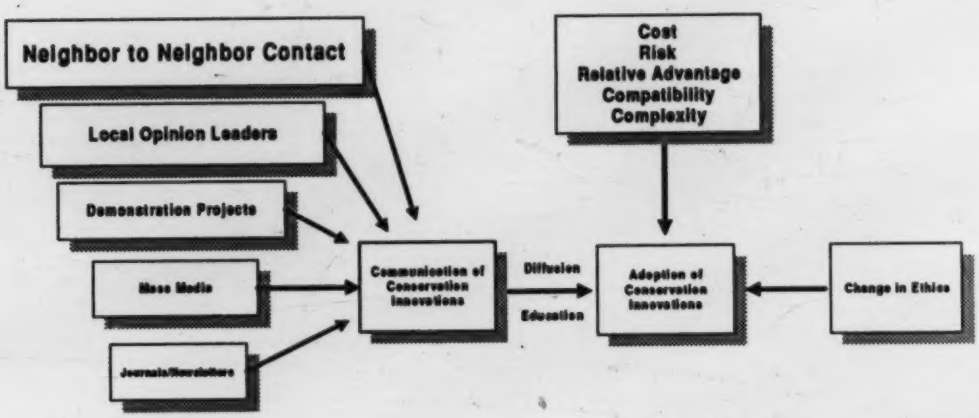
Only 3.5% of respondents were interested in conservation easements or replanting native species, and only 6.6% would consider enhancing habitat for wildlife or building nesting boxes. These results relate to the lack of commitment to wildlife conservation, due, in part, to the time, money and effort required. Unfortunately, there seems to be a lack of political will to support agriculturists through subsidies that might make committing land to wildlife easier. This lack of will is supported by lower grain prices, lack of subsidization, and/or tax breaks.

Less than half of the respondents (42.3%) were interested in learning about habitat improvement (compared to 78% of non-participants in the Landowner Habitat Project), and 69.2% would not be encouraged to conserve habitat even if recognized. These results are disconcerting, as learning about habitat improvement may require something as simple as attending a meeting, or reading an article, an effort that many landowners are not willing to do. Recognition does not seem to be a great motivator for habitat preservation and when cross-tabulated does not give significant results. This

may be important for conservation agencies, that they may want to consider using strictly monetary compensation in hopes of encouraging more people to become habitat stewards.

Socio-demographically, almost half of respondents were between the ages of 31-50 years of age and were all men. Over half of respondents (55.8%) had more than a high school education, and almost half (42.3%) made over $100,000 annually before taxes. It is not surprising that all of the respondents were male, having a small sample size and the tradition of most farms being owned and run by men. Larger incomes could be attributed to the overall large size of the farms and soil fertility characteristic of central Alberta.

Figure 1. Factors Affecting the Adoption of Conservation Innovations



5.2 Conservation innovation model

To understand the most important factors that affect the communication and adoption of conservation innovations, the most common responses from the survey questionnaire, the personal interviews with landowners, and interviews with conservation agencies were summarized (Figure 1, pg. 49). The results revealed a model that resembles the classical diffusion model illustrated by Fliegel (1993) and the results obtained by Alberta Agriculture in 1983. Fliegel identifies that membership to farm organizations (such as the P.A.R.I farm), and participation in community organizations are important influences in the overall adoption process. Alberta Agriculture found that neighbors, radio and extension contact were the most important sources of information/influence. Steed (1969), identified personal contacts with neighbors, extension sources and experimental farms as the most important influences. These were also important influences in my own study, although contact with neighbors and local opinion leaders were the most important. In terms of communication, Fliegel identified extension contact, print media and radio contact as important sources of information. These sources do not concur with the results of my study. Instead, more passive sources of information, such as neighbors and local opinion leaders, are the most widely used or accepted by landowners. These sources of information are less intrusive compared to mass media and journals/newsletters.

The adoption of conservation innovations seem to be affected by the cost to the landowner to initiate the conservation project and risk to the landowner in terms of profit loss and the amount of time required to maintain the project. These results are not surprising, as one would expect these factors to be the most common deterrents to initiating a stewardship project. As with the adoption of many innovations, a change in ethics was commonly mentioned by agencies to be an important factor in the overall diffusion process. A change in ethics will likely result from increased education (supported by Nowak, 1987) which can result in greater environmental literacy and advocacy. These factors, coupled with support from neighbors and local opinion leaders and minimal financial investment on part of the landowner, will likely increase the amount of support for private land stewardship in Alberta.

5.3 Significance of cross-tabulations

There were significant results from cross-tabulations regarding landowners' attitudes toward conservation. Although not significant (Chi-Square 3.77, p=0.152, df 2), more landowners who were currently involved in conservation projects were also more aware of agencies with conservation mandates. This is what one would expect, as landowners who are involved in their own conservation projects become aware through agencies, thus recognizing the potential benefits. This shows that there is a synergy between a landowner's personal commitment to conservation, and efforts made by various conservation oriented agencies.

Although not statistically significant (Chi-Square 5.39, p=0.067, df 2), more individuals who received newsletters regarding conservation could also name agencies with a conservation mandate. This result is not too surprising, as many newsletters or publications are endorsed and supported by those agencies named by the individuals. Exposure to information from newsletters and agencies should result in increased knowledge and subsequent adoption of innovations. However, such a trend was not observed. Previous studies have shown, regarding the communication of innovations, that effective diffusion of new practices and/or ideas does not come through local media (newsletters, radio, TV) and agency representatives. Instead, effective communication, diffusion and adoption often comes through neighbor to neighbor contacts or through respected opinion leaders in the community (Figure 1, pg. 49). Agency representatives may be more threatening to landowners, and may discourage some individuals from engaging in land stewardship agreements.

It is important to note that 21% of individuals who were aware of agencies do not receive newsletters. This seems to defy the correlation that people who receive newsletters are more likely to be aware of conservation agencies. This discrepancy could be attributed to the type of newsletters people receive and agencies they reported. In fact, quite a few newsletters and journals named were strictly agriculture related (CAESA Updates, Western Producer), while others were strictly wildlife related (Ducks Unlimited) or do not operate on a conservation mandate (Alberta Cattle Commission). Perhaps there is little connection between knowledge of conservation agencies and exposure to literature. In other words, many landowners who read agriculturally related journals may not be aware of wildlife oriented agencies or vice versa. Consequently, habitat agencies may wish to use agriculturally related journals and newsletters to increase awareness among members of the agricultural community regarding wildlife habitat agreements and the potential benefits to farmers. This result is supported by a recent article published on the effectiveness of using calendars to promote conservation

behavior (Messmer et al., 1996). They used publications such as the Farm Journal and Beef Today, which have an annual combined circulation of over 800,000 individuals, to develop their participant database. They received more requests for the calendars than they could fill.

There was a significant (Chi-Square 6.63, p= 0.01, df 1) relationship between attendance at conservation meetings and whether or not the respondent received newsletters supporting conservation. Results showed that proportionately more respondents who attend meetings also receive newsletters. However, over one quarter of respondents who attend meetings do not receive any newsletters. In the same way that there are discrepancies between receiving newsletters and knowledge of conservation agencies, there may be discrepancies between receiving newsletters and attendance at conservation meetings. Again, wildlife related conservation agencies may want to consider advertising upcoming meetings in agricultural journals to try and reach a greater audience.

There was also a significant relationship (Chi-Square 7.74, p= 0.02, df 2) between knowledge of conservation agencies and attendance of conservation meetings. Results showed that more individuals who did not attend meetings were not able to name agencies with conservation mandates. One third of the sample was able to name agencies but did not attend meetings. This discrepancy could be related to a respondent's perception of agencies with conservation mandates and subsequent lack of awareness of, or exposure to community conservation meetings. Alternatively, more respondents could report knowledge of agencies through listening to media or seeing local signs but may have no personal interest in or awareness of conservation meetings.

Although not statistically significant (Chi-Square 6.56, p=0.161, df 4), half of the respondents who were aware of conservation agencies would not be encouraged to conserve habitat even if they were recognized by the agency. This result is disconcerting, given the fact that an agency's main message to landowners is that the wildlife community is being jeopardized by a lack of habitat. One would have expected that more individuals, who were aware of agencies' mandates, would be encouraged to preserve habitat regardless of recognition. This sends an important message, that perhaps simple recognition will not be enough to increase the amount of privately conserved land and that monetary compensation may be necessary (Figure 1, pg. 49).

There was a significant relationship (Chi-Square 45.47, p= 0.02, df 28), between a landowner's knowledge of conservation agencies and whether any area had been broken and brought into cultivation in the past 5 years. Proportionately, more individuals who were aware of agencies did not break or clear land, than individuals who were unaware of agencies with conservation mandates. However, it is important to note that

more individuals who were aware of agencies broke or cleared some land overall. This could be attributed to several explanations: the land was broken in ways to improve land for wildlife, individual disagreement with agency mandates, or for personal financial reasons.

Although not statistically significant (Chi-Square 3.80, p=0.284, df 3) comparison of a landowner's opinion of the importance of wildlife and natural areas, showed that more individuals who were involved in conservation projects also rated the importance of wildlife and natural areas as more important. Perhaps individuals who have made a personal commitment to conservation also have a stronger land preservation ethic. One would hope that through increased awareness, a stronger preservation ethic would prevail and lead more landowners to conserve wildlife habitat.

Statistically significant results (Chi-Square 18.28, p=0.050, df 10) were obtained from a comparison of respondents' education and whether or not they thought that the breaking and clearing of land was contributing to decreasing wildlife populations. However, no significant patterns or numbers were evident in the data. One would have expected individuals with more education to believe that wildlife populations were decreasing due to habitat alteration, however this was not the case. Note that 70% of respondents did not believe that wildlife populations were being affected by habitat clearing, regardless of their education. This could be explained by a landowner's personal opinion of specific wildlife populations, having not seen any changes in wildlife populations on their own land, or an overall lack of awareness regarding wildlife fluctuations. Agencies may wish to reinforce the message that habitat and wildlife are inextricably joined. It is also important to ensure that television, radio and newspapers also relay this important message.

Statistically significant results were observed when education was cross-tabulated with income (Chi-Square 26.15, p= 0.036, df 15). Respondents with greater than a post-secondary education made more than $50,000 annually. The greatest number of respondents making $100,000 or more, have some post-secondary education, but do not have a university degree. These individuals may have inherited large parcels of land or may share operations with other family members thus creating a greater annual income.

Although not statistically significant, individuals with greater incomes generally receive more newsletters (Chi-Square 6.82, p=0.078, df 3) and attend more meetings (Chi-Square 7.03, p=0.071, df 3). One could speculate that this relationship could correlate with the significant relationship from a comparison of education and income (Chi-Square 26.15, p=0.037, df 15), that as education and income increase, individuals may be more aware of a variety of educational materials and attend conservation

meetings. It is also possible that newsletters come with membership fees to various agencies and that with increasing income respondents are more likely to afford possible membership fees.

Income was also related to respondents' enjoyment of wildlife on their own land (Chi-Square 26.85, p= 0.00015, df 6). Significance could be attributed to the number of respondents who said that wildlife added enjoyment to living. It is also likely that individuals making a greater income worry less about losses related to wildlife due to crop damage, flooding and wildlife predation. When income was compared to whether land had been broken or cleared in the past 5 years, a significant result was obtained (Chi-Square 80.92, p= 0.00029, df 42). However, no distinct patterns could be observed. One would expect that individuals with lower incomes would tend to break more land to increase their income. This was not apparent in the data. It is also possible that larger incomes are a direct result of the breaking and clearing of land, which could result in more land being put into production, or less depending on the respondents' motives and satisfaction with their annual income.

A cross-tabulation of individuals who are interested in learning about habitat improvement (42.3%) with other related variables revealed four interesting and significant results. When interest in habitat improvement was cross-tabulated with awareness of conservation projects, a significant results was obtained (p= 0.004, df 8). This result is likely due to the vital link between awareness and interest. This connection has been described in innovation theory, where, as awareness about an innovation increases in society, so too does the overall interest. When the question regarding whether or not the destruction of habitat was leading to wildlife population decline was cross-tabulated with interest in habitat improvement, significant results were obtained (p= 0.045, df 4). This result carries tremendous weight as to the importance of reinforcing the message regarding the connection between habitat and wildlife. Significant results (p= 0.044, df 2) came from a comparison of interest in habitat improvement and whether or not landowners were currently involved in conservation projects. Here too, a logical and important connection is illustrated between education, awareness, interest and the adoption of conservation innovations (Figure 1, pg. 49). Lastly, significant results came from a comparison of interest in habitat improvement and the landowner's opinion of the importance of the preservation of natural areas (p= 0.033, df 6). Here, an overwhelming majority (81.8%) of those individuals who were interested in habitat improvement also felt that the preservation of natural areas was important to extremely important. Once again, education and awareness are shown to play an important role in landowner's attitudes toward conservation.

5.4 Personal Interviews with landowners

Conservation projects landowners would be willing to undertake focus on agriculture, not on conserving wildlife habitat. Less than half of the landowners interviewed would engage in conservation projects which require setting land aside for wildlife, re-seeding native plants or preserving wetlands. Most responses focused directly on agricultural conservation. When landowners were not involved in projects, financial rewards or incentives were the most commonly mentioned requirement to engage in almost any project related to agriculture or wildlife. If landowners are to be encouraged to preserve habitat, some form of government subsidy, tax break or direct payment from agencies will likely be required. Payment or subsidization would likely have to match or exceed the income the landowner could receive by placing the land into production. Second to financial incentives, was the utility of the project to their current practices. This follows innovation theory, where, as utility to the landowner increases, so do the adoption of new practices (Figure 1, pg. 49). It may be useful to design some wildlife habitat agreements that work into the agricultural landscape. Ducks Unlimited and the NAWMP have successfully experimented with land use exchange programs. Here, land that is critical for wildlife is taken out of production/grazing. In exchange for this loss, land which is owned by another landowner, the crown or an agency, that is less critical to wildlife, is used for production/grazing. A win-win situation is created, although at some inconvenience to the landowner when machinery and/or livestock must be moved to different locations.

The most common influences for those landowners involved in conservation were personal ethics, the P.A.R.I demonstration farm and neighbors (Figure 1, pg. 49). Many landowners had seen drastic changes in soil quality over the years, and felt the need to try conservation practices such as direct seeding and reduced tillage in order to slow the erosion process on their own land. Some landowners had seen conservation projects on the demonstration farm or on their neighbor's property and were motivated to make changes to their own farming practices. These landowners stressed the importance of innovative neighbors for overall changes in the community (Figure 1, pg. 49). Innovative neighbors are often the opinion leaders or change agents in the community. If used properly, they would likely be very effective at influencing others to engage in habitat agreements. Many landowners felt that there was a lot of "fence-watching" and "coffee shop talk", that contributed to the adoption of new practices for some landowners who would otherwise not consider new ideas. Many landowners found it less threatening when ideas came from respected individuals within the community rather than government or NGO's. All landowners interviewed felt that they had

influenced someone else in their decision to support conservation. Most felt that they had influenced their neighbors and family members. Many landowners who were practising conservation through projects such as direct seeding or preserving wetlands found it very successful and satisfying and had an increased appreciation for wildlife.

5.5 Personal interviews with conservation agencies

Agencies commonly claimed that their primary focus was widely based programs. This could be a potential flaw among agencies, as landowners surveyed generally separated agricultural conservation from wildlife habitat preservation. Agencies may wish to direct programs accordingly. Many agencies commit fees to generate land conservation agreements and to increase awareness. These seem to be worthwhile goals, as financial incentives are key to preserving wildlife habitat and awareness is necessary to lobby support and increase partnerships. Moneys are usually generated from hunting dollars and/or government funding. Over the long term, a tax break system might be more practical to reward participants instead of having to provide direct funding. This will ultimately take the burden off conservation agencies, freeing up money for other ventures. Depending on the agency, the most successful approach ranged from continual one-on-one communication with landowners to minimal intrusiveness. A variety of approaches is appropriate to cater to many different individuals. Some agencies focus on land purchase, while others focus on creating land use exchange programs between landowners so that more appropriate and contiguous areas of habitat may be set aside for wildlife. Purchasing parcels of wildlife habitat will ensure protection over the long term, but agreements with landowners will ensure that more contiguous areas of habitat can be preserved. Ideally, a blend of approaches could occur to maximize the amount of wildlife habitat protected.

The least successful aspects of the organizations included lack of publicity, funds and monitoring of agreements. Marketing and awareness difficulties could be corrected with increased support from agency members and/or government. Advertisements could be placed in local newspapers, agricultural and conservation journals, in hopes of increasing awareness and attendance at local meetings. Monitoring may require increased personnel, in which case additional moneys may be necessary. Additional funds may be obtained through corporate donations/sponsorships, lotteries or through bank affinity credit cards. In addition, most agencies felt that there was a general lack of awareness among landowners and uncertainty as to the effectiveness of habitat agreements. It might be useful to profile certain cases, offering tours to individual's land in order to decrease suspicion, and show how preserving habitat can be

compatible with existing practices. An additional problem for some organizations was the public opinion that agencies were designed to support hunters. This may not be easily rectified as agencies such as Ducks Unlimited are supported in part by hunters. Perhaps through an increased awareness as to the effectiveness of conservation programs, and other funding sources, public concerns may be reduced.

When asked if they could change certain aspects of their programs, many agencies responded that they would increase marketing, hire more staff to execute and monitor agreements and increase compensation rates. In addition, many agencies felt that changing policies that negatively affected wildlife would also help (e.g. loss of government subsidies). Many agencies also felt that they would create a more holistic or multi-species approach. Another critical observation, made by one agency representative, was that people needed to be managed, not wildlife.

Agencies have learned to treat every case separately and that paying landowners indefinitely will not be a viable option. Many feel that compensation for the agreement term is important, and necessary to increase the number of habitat agreements, but that long term funding would be difficult. In the future, agencies see an increased burden on private landowners to conserve habitat, and an increase in the number of organizations designed to support wildlife. Additional agreements could pose a definite financial problem to agencies with small budgets, reinforcing the notion that long term compensation would be difficult. Agencies felt that a change in land ethics has begun to permeate among landowners. A change in ethics is extremely important, especially if long term compensation is impossible. With decreasing subsidies, more land could be placed in production, however, if a strong conservation ethic exists, many landowners may find alternative ways of keeping a stable income while conserving habitat. One agency predicted an increased market in tourism in and around private lands. Potentially, moneys accrued through wildlife viewing, recreation, and possibly hunting on private lands could be used to create new wildlife habitat agreements or maintain existing ones.

5.6 Chapter Summary

Over half of respondents are involved in conservation projects although most are agriculturally oriented. Many landowners are unwilling to conserve habitat for wildlife even if recognized, although some would be encouraged to do more, if compensated. Some landowners have also suffered loss as a result of wildlife (crop and/or stock predation), and may feel that preserving habitat may lead to greater loss. Agencies may wish to vary their programs accordingly, having some agriculturally based programs (e.g. land use exchange programs), and some wildlife habitat programs.

Habitat loss was rated as the fourth most threatening issue facing Alberta, next to air and water pollution and urban development. Landowners may place less importance on habitat loss because they perceive urban development, and air and water pollution, to directly affect their livelihood. An overwhelming majority felt that the breaking and clearing of land was not affecting wildlife populations but did feel that 10-25% of the landscape should be left natural. An overall lack of awareness seems to prevail as to the connection between habitat and wildlife. Environmental awareness and advocacy should improve using a variety of channels (newsletters, Internet, radio and television) to communicate information regarding habitat and wildlife. However, many studies and landowners claim that an even more effective method is through the opinion leaders in a community. These individuals have been found to be very effective at delivering new messages to a more traditional community.

Interviews with agencies revealed that financial compensation is necessary to initiate new agreements. Money may come from a variety of sources including taxes, cost sharing with government and/or municipalities, corporations and banks. However, a change in ethics will be necessary for long term commitments. This way, some money could be available for other ventures, such as marketing, education programs and staffing. Many landowners are still suspicious of habitat agreements. Agencies may find it useful to profile certain cases by offering tours and allowing a landowner's personal testimony to reduce suspicion. Unfortunately, private landowners bear the responsibility of sustaining wildlife populations outside of protected areas, as they posses some of the only natural areas left in central Alberta. As wildlife is very important to Albertans, we should want to contribute to wildlife habitat conservation. Consequently, it should be the community's and government's responsibility to help support private landowners in their efforts to conserve wildlife habitat. Support may come through financial assistance or through personal efforts helping enhance, create or maintain habitat for wildlife.

6 RECOMMENDATIONS

6.1 Inventory of wildlife habitat on private land.

Although it is already being done by agencies such as the Nature Conservancy, the National Waterfowl Management Plan and Ducks Unlimited, an inventory of important wildlife habitat held on private lands is critical to a systematic and rigorous approach to land stewardship in Alberta. Using an ad hoc approach to preserving or improving land for wildlife could be a wasted effort if landowners are uncooperative or if the land is not suitable.

6.2 Support the innovators in the community.

It is important to support those individuals who are already committed to conservation to continue their efforts toward conserving land for wildlife. These individuals are often termed the innovators and early adopters in society representing approximately 16% of the population. It is the middle portion of the population (68%) or what diffusion research would describe as the early and late majorities who should receive our attention. They represent the majority of the population who potentially own significant portions of land that might be appropriate land for wildlife habitat preservation. These individuals are generally thought, by diffusion theory, to have a good income and average to above average education and may be more willing to leave some land out of production as opposed to those individuals who make less money and need as much land as possible to survive.

6.3 Target conservation programs to specific audiences.

Conservation programs tend to target a wide audience which often includes agriculturists and acreage owners. This approach does not seem to be very effective as agriculturists have different concerns and opinions regarding conservation than do non-agriculturists. There seems to be a separation of concern regarding conservation, either focusing on wildlife or on soil and water conservation. I do not propose that separate agencies be created to handle agricultural vs. wildlife oriented conservation but that programs be targeted to specific audiences depending on their needs.

6.4 Encourage and recognize the importance of interpersonal communication regarding adoption of new practices.

Communication of innovations and ideas commonly occurred neighbor to neighbor or from local opinion leaders (e.g. agricultural fieldmen) to other members of the community. This type of communication seems to be less threatening as individuals' curiosity and natural social rapport with opinion leaders in the community can naturally lead to a transfer of knowledge. This is important in that some forms of communication seem to be relatively ineffective such as radio, meetings and newsletters and perhaps more emphasis should be placed on understanding the exchange of information and ideas between individuals. Identifying local opinion leaders and using them to encourage landowners to participate in land stewardship could be very effective. Diffusion research states that the innovators and early adopters in society significantly affect the majority of the population to adopt new innovations through their own personal trials.

6.5 Facilitate environmental advocacy and awareness through education.

Increasing environmental awareness generally acts as its own catalyst to increasing efforts toward conservation. Therefore, it is imperative that information regarding the importance of wildlife habitat preservation be communicated to landowners through a variety of channels. Using local opinion leaders and agricultural publications may be the most cost-effective and useful ways to send a conservation message to landowners. Another communication channel is the use of calendars. An overwhelming majority (98%) of landowners surveyed in the United States adopted more than one of the wildlife conservation practices suggested by the calendar.

6.6 Maintain and monitor new and existing agreements.

Once agreements are arranged it is imperative that either a local individual who is well respected in the community or a member from the conservation agency return to ensure that the agreement is maintained and that recognition of effective stewardship be given. Through frequent contact the landowner may be more convinced of the importance of what he/she is doing and that just as it is an investment for him/her, it is also an investment on part of the agency. Through this monitoring, ineffective projects may also be identified and moneys being spent may be better spent on other areas or agreements that are more successful.

6.7 Change existing tax structure, promote conservation legislation and increase funding to support agency efforts.

Without a change in the existing system, hope of preserving agreements and creating many new ones will be slim, as agencies do not have the necessary funds. Creating and enforcing legislation regarding land stewardship will ensure lasting and effective agreements. Requesting more support from government, municipalities, corporations and banks will enable agencies to increase awareness through a variety of marketing efforts to hire more staff and to adequately compensate landowners that enter agreements. In addition, appropriate crown land could be purchased by members of society under the direction of conservation agencies.

6.8 Consolidate conservation agencies.

There is an overwhelming number of different agencies designed to support habitat and/or wildlife conservation. It might be useful to consolidate many of the agencies, their efforts, staff, and funding into one conservation cooperative. I believe that many landowners are confused by the number of agencies and do not know which one to approach, depending on the nature of the project. One cooperative agency could offer a host of different agreements and/or projects to landowners, and hopefully rally together to create greater support for conservation of wildlife habitat in Alberta.

6.9 Certify conservation agencies

Certification acts as a tool to standardize conservation agencies' efforts which could lead to increased credibility. Standardization of agencies will likely lead to an overall ease of program implementation and monitoring as program objectives are defined universally. Certification can also standardize incentives or compensation rates based on the quality or amount of habitat to be placed in the program. This may lead to increased acceptability of private land stewardship and increase the value of habitat. If landowners "register" their land with a certified agency, as opposed to a non-certified agency, the value of their land may increase and fewer landowners will sell their land for lower prices.

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8 APPENDICES

1 Pre-test cover letter

Dear Survey Participant,

You have been selected through the County of Camrose's list of landowners as a pre-test survey participant. The County of Camrose neighbors the County of Minburn, the area ultimately chosen for the study. As I do not wish to accidentally survey the same individual twice I felt that the County of Camrose landowners would be ideal for a pre-test, since land use is very similar in both areas. Pre-tests are usually done in order to ensure that the survey instrument is clear and easy to understand. In addition, comments and suggestions are also useful prior to the actual study in order to reduce any error and confusion.

This questionnaire is aimed at understanding landowner's current attitudes toward conservation and private stewardship initiatives. The results obtained from this study will be used as the basis for my master's thesis at the University of Alberta, Department of Renewable Resources.

I think that you will find the questionnaire easy to understand and interesting. It should only take about 30 minutes to complete. Please ensure you complete all questions by circling the appropriate response or writing in the space provided as neatly as possible.

There are no incorrect answers. Just answer as honestly and as thoroughly as possible. Several steps will be taken to ensure that you answers are kept confidential.

Completion of this questionnaire is entirely voluntary but your involvement and comments would be most appreciated. Your comments will enable me to complete my master's thesis with the confidence that the views of the community are represented accurately.

Enclosed is a sheet of paper to be used for comments, any difficulties you may have had, and a space for the total time spent on the questionnaire.

Please fill this questionnaire and the comment sheet out now and return it in the

enclosed envelope. Returning it promptly is very important. No stamp is necessary as postage is prepaid.

Thank you for participating in my pre-test to my study, your input will be very helpful.

Sincerely,

Mandy Fisher, B.Sc.
Graduate Student, Department of Renewable Resources, University of Alberta.

2 Survey cover letter

Dear Survey Participant,

Thank you for completing this questionnaire regarding landowner's current attitudes toward conservation and private stewardship initiatives. Completion of the survey shows your support toward habitat conservation. The results obtained from this study will be used toward my master's thesis at the University of Alberta.

I think that you will find the questionnaire easy to understand and interesting. It should only take about 30 minutes to complete. Please ensure you complete all questions by circling the appropriate response or writing in the space provided as neatly as possible.

There are no incorrect answers. Just answer as honestly and as thoroughly as possible. Several steps will be taken to ensure that your answers are kept confidential.

- all responses will be grouped together before being analyzed so that no information is reviewed for any one individual.
- information obtained will be used exclusively for research purposes in connection with the thesis.

The questionnaire has also been reviewed and approved by the ethics committee at the University of Alberta.

Completion of this questionnaire is entirely voluntary but your involvement would be most appreciated. Your response will enable me to complete my master's thesis with the confidence that all the views in your community are represented accurately.

If you wish, a two to three page summary of the final thesis will be available upon completion and can be obtained by writing to the address above. I expect to finish by the spring of 1997 and would be more than happy to mail you a copy of the summary or answer any questions at that time.

Please fill this questionnaire out now and return it in the enclosed envelope. Returning it promptly is very important. No stamp is necessary as postage is prepaid.

Thank you for participating in this survey, your input is greatly appreciated!

Sincerely,

Mandy S. Fisher, B.Sc.
Graduate Student, Department of Renewable Resources, University of Alberta.

3 Survey questionnaire

QUESTIONNAIRE

(Please circle the relevant number or numbers and print the longer answers, thank you.)

PART A: BACKGROUND INFORMATION

1. Location of residence Twp Road_____ RR_____ or equivalent address:_____

2. What is the size of the parcel of land you currently own (in acres)?

Less than 320	1
321-640	2
641-1120	3
More than 1121	4

3. How long have you lived on this land?

1-10 years	1
11-20 years	2
21-30 years	3
More than 30 years	4

4. Do you own or lease the land?

Own	1
Lease	2
Both	3

5. What is the land primarily being used for? (On the basis of income generated/area) Please circle more than one if applicable.

Agriculture	1
Ranching/Grazing	2
Hogs	3
Poultry	4
Residence only	5
Recreational area	6
Other (please specify)	7

_____

6. How much of the total area is:

Cultivated (in acres) (includes forage crops, grain crops and summerfallow)

_____

Non-cultivated (includes native grassland, woodland, sloughs/ponds)

_____

7. How many acres, approximately, have you drained in the last 5 years? _____

8. How many acres, approximately, did you also break and bring into cultivation in the past 5 years? _____

9. How many acres, approximately, of bush and prairie have you cleared or broken in the past 5 years? _____

10. If you have cleared, broken or drained land in the past 5 years, what were the reasons for doing so? Please rank the top three reasons with #1 being the most important.

To discourage the presence of wildlife	___
To increase net income	___
To "clean up" weedy areas	___
To eliminate areas where insects live	___
To provide better visibility (of livestock, road area)	___
To increase ease of maneuvering machinery	___
To remove water from flooded land	___
To lower the water table	___
Irrigation	___
To control beavers	___
Other (please specify)	___

_____

_____

_____

PART B: ATTITUDES TOWARD CONSERVATION

(The following questions are designed to understand your opinions toward wildlife, habitat conservation initiatives, awareness about the environment and land use practices. Your answers are important as they will help me to identify the important links between attitudes and conservation in your community.)

11. Are you currently involved in any conservation projects on your property? If yes, please specify what and for how long.

___ Yes (Go to question 12) 1

_____

_____

_____

___ No (Go to question 13) 2

12. How did you become aware of the conservation project? (Please check more than one if applicable).

Personal initiative	1
Newsletter/Radio	2
Friend	3
Demonstration Farm	4
Other (please specify)	5

_____

_____

13. Do you receive any newsletters, publications or journals that might have influenced your attitude toward conservation? If yes, please name a few of them.

___ Yes (Go to question 14) 1

_____

_____

_____

___ No (Go to question 14) 2

14. Do you currently attend any conservation meetings regarding your community? If so what is their affiliation, how often and where?

___ Yes (Go to question 15) 1

_____

_____

___ No (Go to question 15) 2

15. What do you feel are the three most threatening environmental issues facing our province today? Please rank them accordingly, with #1 being the most threatening.

___ Air pollution	1
___ Watershed pollution	2
___ Species loss	3
___ Habitat loss	4
___ Logging	5
___ Overhunting	6
___ Urban development	7
___ Agricultural development	8
___ Government spending regarding the environment	9
___ None	10
___ Other (please specify)	11

_____

_____

16. Of the six natural regions found in Alberta: Boreal Forest, Canadian Shield, Rocky Mountain, Foothills, Parkland and Grassland, which do you feel is most threatened?

Boreal Forest	1
Canadian Shield	2
Rocky Mountain	3
Foothills	4
Parkland	5
Grassland	6

17. Do you know three or four provincial agencies, either governmental or non-governmental that have a conservation mandate? If so, please name them.

Yes ___ (Go to question 18) 1

1._____

2._____

3._____

4._____

No ___ (Go to question 18) 2

18. Please list those voluntary conservation programs that you are aware of that are available to private landowners.

_____

_____

_____

_____

19. In your region, over the last 5 years, do you think there has been a change in the number of:

(1= Decreased; 2= Increased; 3= No Change)

Deer (White-tailed)____

Upland birds (hawks, owls, pheasants, grouse) ____

Waterfowl (ducks and geese) ____

Beaver ____

Large carnivores (coyotes, wolves, foxes) ____

Songbirds ____

20. What is your opinion on the number of the following types of wildlife on your land?
(1= Too little; 2= Too much; 3= Just enough)

Deer ____
Upland birds ____
Ducks ____
Geese ____
Beavers ____
Songbirds ____

21. Do you think that the breaking and clearing of native habitat in the last 5 years is significantly decreasing wildlife populations in your area?

Yes (Go to question 22) 1

No (Go to question 22) 2

22. Does the presence of wildlife add to your enjoyment of working or living on your property?

Yes (Go to question 23) 1

No (Go to question 23) 2

23. Did you suffer any loss from wildlife presence on your land within the last year?

Yes (Go to question 24) 1

No (Go to question 25) 2

24. What type of loss? Please circle more than one if applicable.

Crop damage by waterfowl	1
Damage by big game (deer, elk)	2
Livestock killed by predators	3
Beaver destroying trees and flooding trees	4
Other damage (please specify)	5

_____

_____

_____

25. How important is the preservation of wildlife and natural areas to you?

Unimportant	1
Somewhat important	2
Moderately important	3
Important	4
Extremely important	5

26. Why is the preservation of wildlife and natural areas important to you?

_____

_____

_____

_____

27. How much of the rural landscape do you feel should be left natural?

None	1
10-25%	2
26-50%	3
51-75%	4
76-100%	5

28. Are there any natural areas (e.g. woodlots or wetlands) left on your property?

___ Yes (Go to question 29)	1
___ No (Go to question 30)	2

29. Why have you maintained these natural areas?

_____

_____

_____

_____

30. Which of the following practices do you already do or might be willing to do to contribute to the preservation of your own property? Check only those that apply.

Rotational grazing	1
Reduced tillage	2
Direct seeding	3
Delayed haying	4
Pursue use of alternative herbicides/pesticides	5
Conservation easement/covenant	6
Wetland preservation	7
Woodlot preservation	8
Habitat enhancement projects for species	9
Build nesting boxes	10
Build bird feeders	11
Replanting of native species	12
Other (please specify)	13

_____

_____

_____

31. Are you interested in learning about habitat improvement on your land? Why?

Yes (Go to question 32) 1

_____

_____

_____

No (Go to question 32) 2

_____

_____

_____

32. Have you ever received any recognition/awards for conservation efforts? If so, please specify.

___ Yes (Go to question 33) 1

_____

_____

___ No (Go to question 33) 2

33. Would some form of recognition encourage you to conserve wildlife habitat? (For example, community signs, recognition in community papers or radio).

___ Yes (Go to question 34)

___ No (Go to question 34)

34. What conditions would have to exist in order for you to enter into a conservation habitat program?

_____

_____

_____

_____

35. If you could name one or two people that you feel best represent your communityís views on these issues, who could be interviewed for a portion of this study, who would they be?

1.

2.

PART C: PERSONAL INFORMATION (to be completed by a member of the household 18 years or older and contributing the most to the family income).

36. Gender:

Female 1

Male 2

37. How old are you? ___ years.

38. How long have you lived in Alberta? ___ years.

39. How long have you lived in your current residence? ___ years.

40. What is your education?

Less than high school	1
High school	2
Some post secondary (Not University)	3
Some university (no degree)	4
University (degree)	5
Post graduate degree	6

41. What is your total family annual income before taxes? I don't need an exact figure. Please select the right category. Was it....

$25,000 - $49,000	1
$50,000 - $99,000	2
$100,000 or more	3

42. Are you interested in the results of this survey?

Yes	1
No	2

QUESTIONNAIRE COMMENT SHEET

Difficulties:

Comments/Suggestions:

Approximate time taken to complete the survey:

Thank you very much. The time you took to do this is greatly appreciated.

4 Reminder letter

Dear Survey Participant;

I wish to remind you of the importance of completing the survey you received in the mail regarding landowner's attitudes toward conservation and private stewardship initiatives.

I encourage you to complete the questionnaire and return it as quickly as possible, as each individual's input is valuable and important. With each additional questionnaire received, the greater the representation of the overall views of the community.

Your participation is appreciated,

Thank you for your time,

Sincerely,

Mandy Fisher
Graduate Student, University of Alberta, Department of Renewable Resources

5 **Interview questions for landowner interviews**

LANDOWNER INTERVIEWS

1. Are you currently involved in any conservation projects on your land, what are they? (If yes to #1, go to question 5) (If no to #1, go to question 2).
2. Can you give me any reasons why you have not considered conservation projects for your land? (Probe if necessary: lack of awareness, financial considerations, personal reasons, no incentives).
3. What factors would have to exist for you to undertake conservation projects?
4. What kind of projects would you consider? Why those?
5. What motivated/influenced you to consider conservation initiatives on your own land? (Probe if necessary: Media, Education, Demonstration Farms, Neighbor, Personal reasons)
6. At what time did you consider conservation projects for your own land? Why then?
7. Have you found the projects(s) to be satisfying and/or successful?
8. Do you feel that you have influenced others in your decision to support conservation privately? How?
9. Who do you feel you have influenced most?

6 Interview questions with conservation agencies

INTERVIEW WITH CONSERVATION AGENCIES

1. What is the primary purpose of (X)? What sets it apart from other land conservation agencies?
2. What is (are) the most successful aspects of (X)?
3. What is (are) the least successful aspects of (X)?
4. If you, or the group of people working for (X) could change things what would you do differently?
5. What have you learned from working with (X)?
6. What kind of future do you see for wildlife habitat protection on private land?